Volume XIII.
Number 3.

SEPTEMBER, 1897.

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TEXTILE WORLD.

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INDUSTRIAL RECORD

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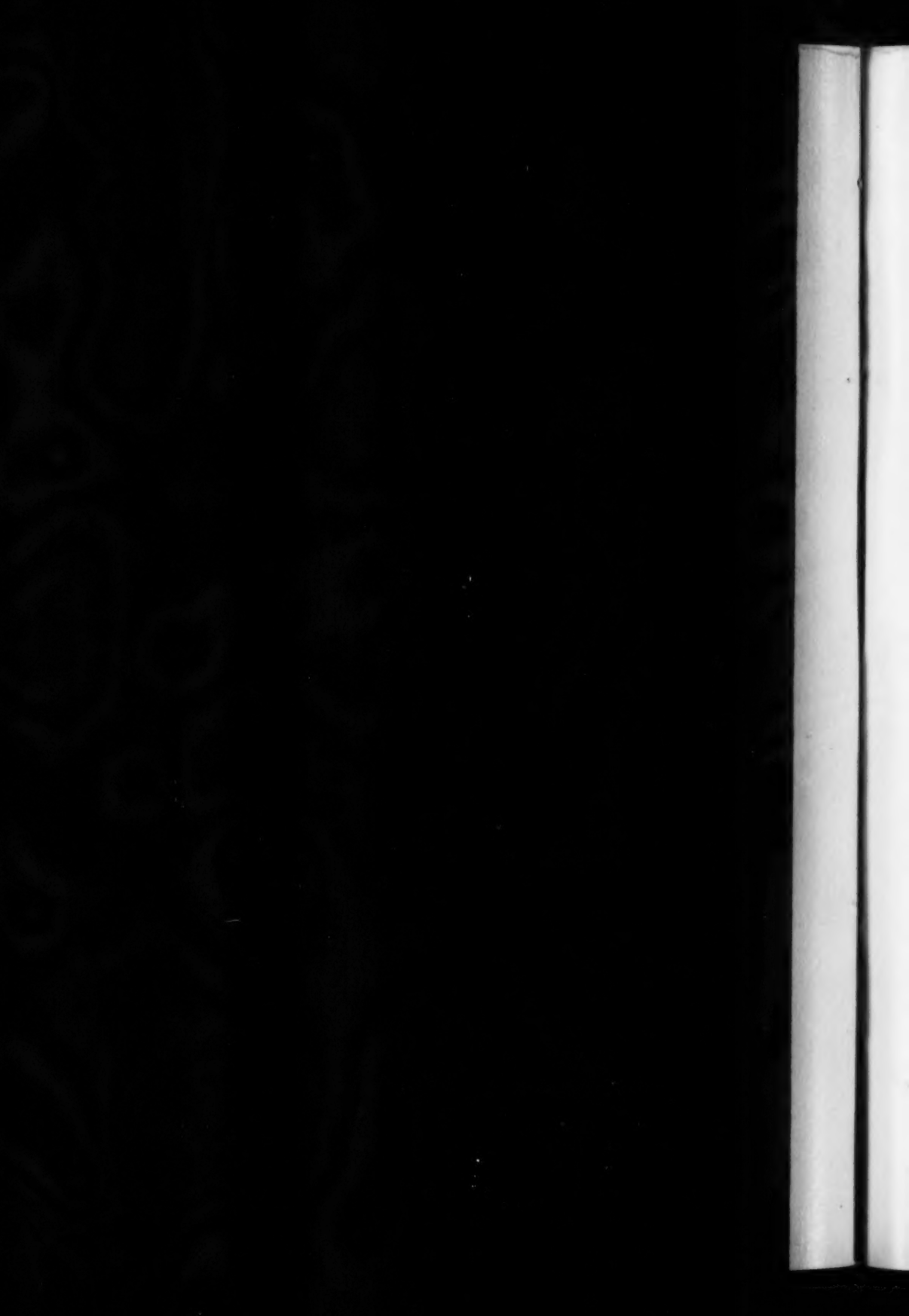

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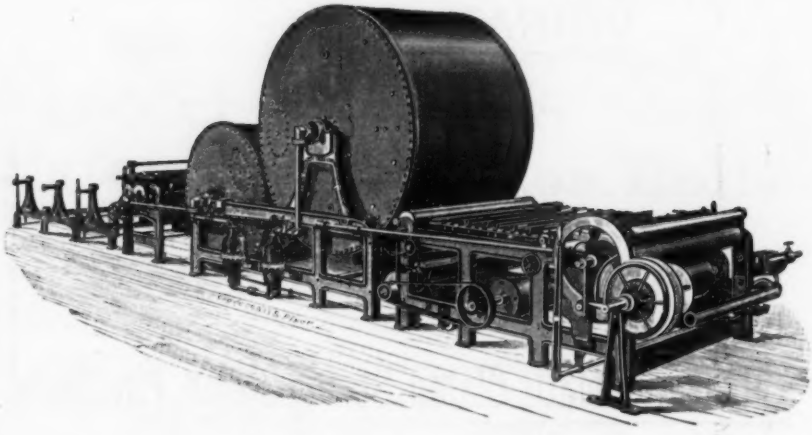

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some fool will praise it, and
nothing so good but that
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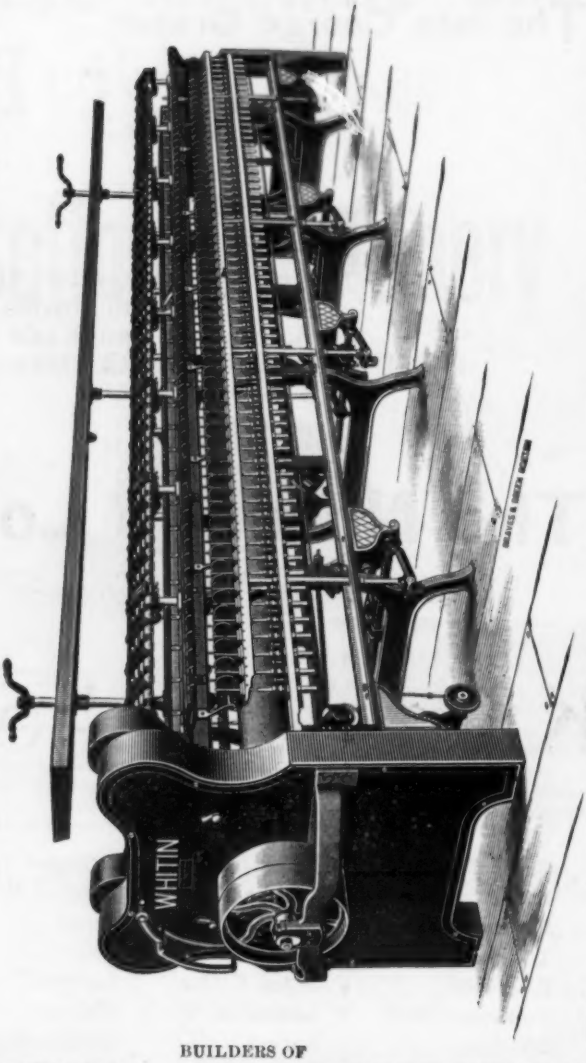

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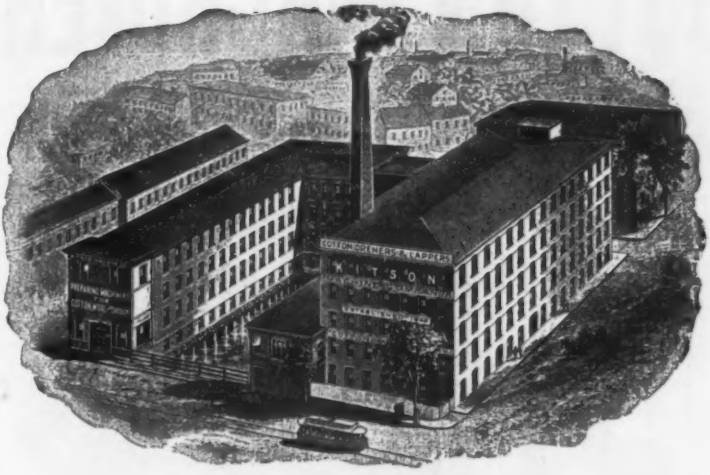

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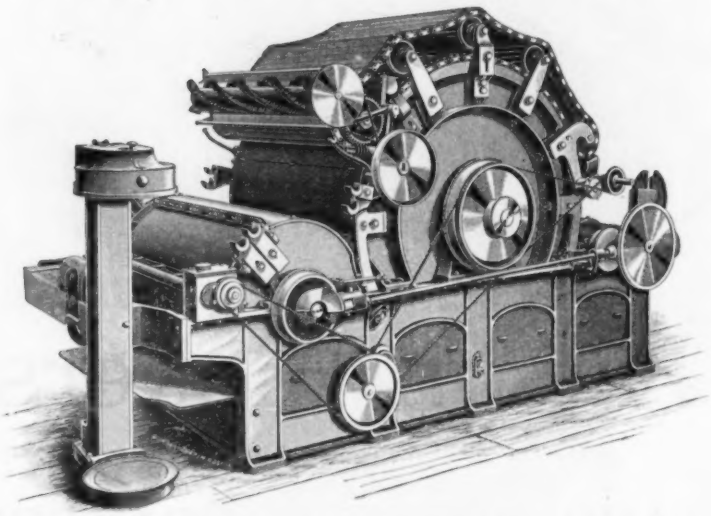

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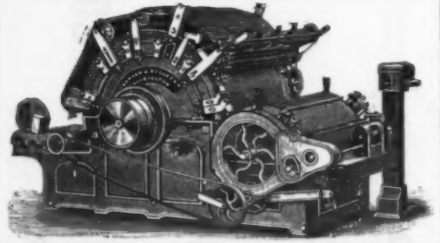

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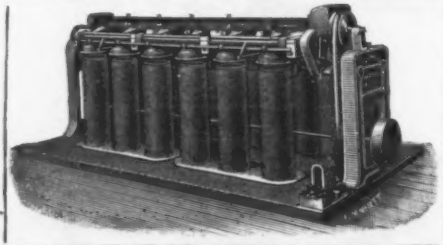

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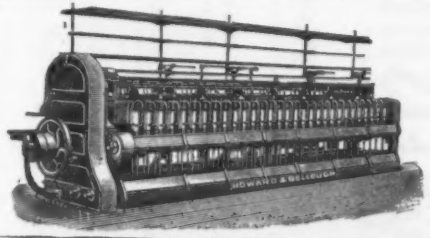

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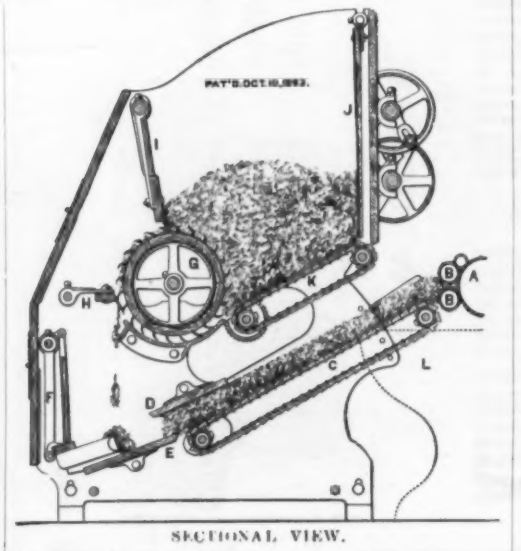

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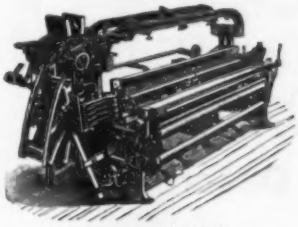

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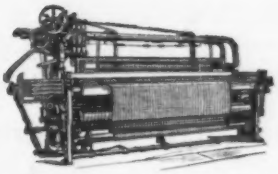

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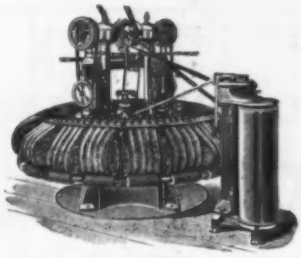

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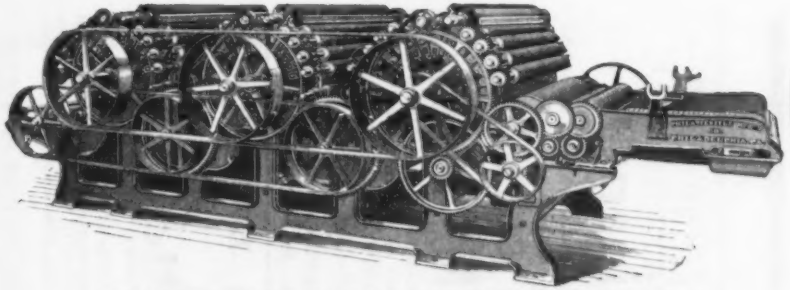

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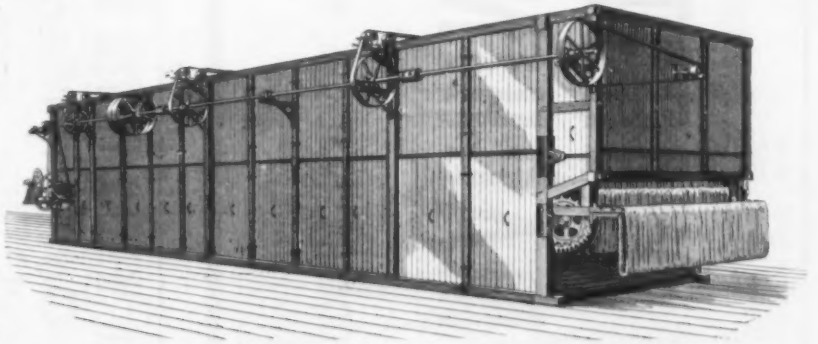

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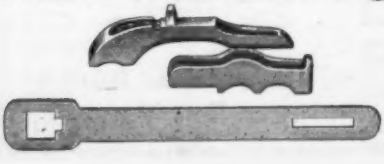

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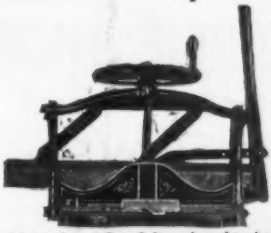

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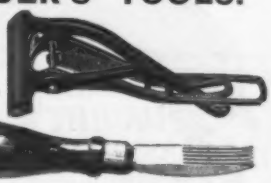

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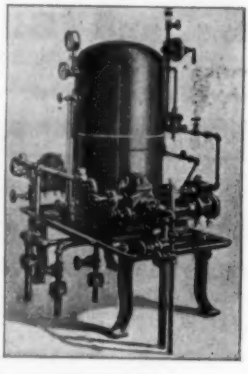

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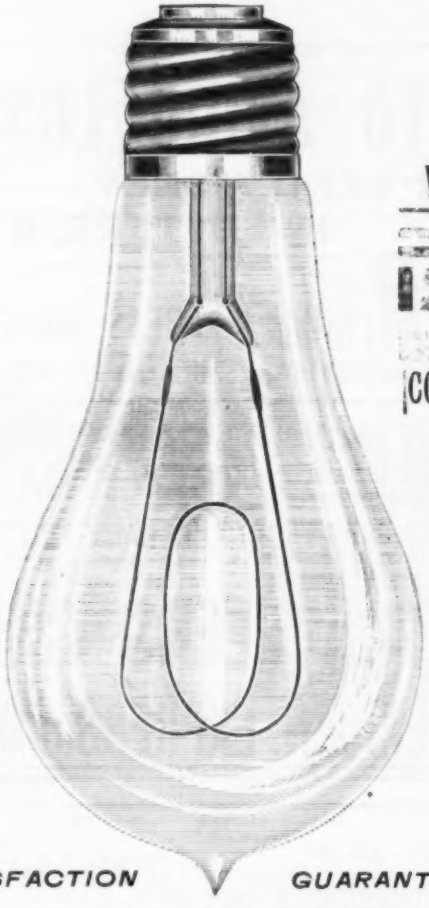

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U. S. Patent Office to enter the firm.

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Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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List of Textile Patents.

Issued August 3, 10, 17 and 24, 1897.

Specifications and drawings furnished for ten cents each. Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Carding Machine Feeding Attachment. 587,629. Stephen W. Woodbury, Winchester, N. H.

Cotton Press. 587,618. Magnus Swenson, Chicago, Ill.

Fabric and Apparatus for Making same. 587,349. Louis P. Warner, Rochester, N. Y., assignor to Schaefer & Schlegel, same place.

Knitting Machine Stop Motion—Circular. 587,351. Albert White and Daniel F. Sullivan, Lowell, Mass.

Loom. 587,652. Wm. F. Draper, Hopedale, Mass., assignor to the Northrop Loom Co., same place and Saco, Me.

Loom for Cross-weaving. 587,324. Isaac E. Palmer, Middletown, Ct.

Loom Heddle—Jacquard. 587,472. Edwin Butcher, Worcester, Mass.

Loom Picker Mechanism. 587,653. Dan'l Durkin, Woonsocket, R. I., assignor to the Northrop Loom Co., Saco, Me., and Hopedale, Mass.

Loom Shuttle Tension Device. 587,352. Ralph Whitley, Paterson, N. J.

Loom Warp Stop Motion. 587,651. Geo. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Maine.

Bobbin and Thread Holder. 587,748 Thomas J. Murdock, Woonsocket, R. I., assignor of one-half to John Roney, same place.

Carding Engine. 587,813. Richard Griffin, Holyoke, Mass.

Carding Engine Feeding Mechanism. 587,815. John Hearn, Hudson, N. Y.

Felt Buffing or Finishing Machine. 588,005. Carl E. T. Dedicke, Dolgeville, N. Y., assignor to Alfred Dolge & Son.

Hat Brims, Machine for Paring curled edges of. 587,943. Carl Eickemeyer, Yonkers, N. Y.

Hat Brims, Machine for Setting curled edges of. 587,944. Carl Eickemeyer, Yonkers, N. Y.

Knitting Machine. 587,957. Robert W. Gormly, Troy, N. Y.

Loom—Electrically Operated. 588,101. Edwin D. Chaplin, Cambridge, and Henry G. Halloran, Boston, Mass.

Loom—Lappet. 587,865. Eppa H. Ryon, Waltham, Mass., assignor of one-half to Alfred M. Goodale, same place.

Loom Reeds, Process of and Apparatus for cleaning and polishing. 587,892. Mathias Walter, Paterson, N. J.

Ring for Ring Twisting Frames. 588,120. Walter Rigby, New York, N. Y.

Tentering Machine Clamp. 587,753. Isaac E. Palmer, Middletown, Ct.

Tentering Machine Clamp. 587,754. Isaac E. Palmer, Middletown, Ct.

Carbonizing Machine. 588,136. A. H. Eyles, Pelhamville, N. Y.

Carding Engine Cover. 588,132. B. A. Dobson and W. J. Bromiley, Bolton, England, assignors to Dobson & Barlow, Ltd., same place.

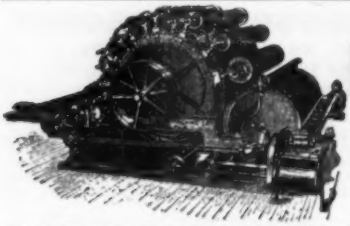
Developing Azo Colors. 588,303. A. Weinberg, Frankfort on-the Main, Germany, assignor to Leopold, Cassella & Co., same place.

Dye—Bluish-Scarlet. 588,180. Ignaz Rosenberg, Biebrich, Germany, assignor to Kalle & Co., same place.

Dye—Brown Substantive. 588,183. Ignas Rosenberg, Biebrich, Germany, assignor to Kalle & Co., same place.

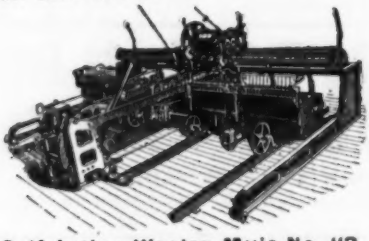
Dye—Gray. 588,397. Albert Cobenzl, Höchst-on the-Main, Germany, assignor to the Farbwerke, Vormals Meister, Lucius & Brünning, same place.

Dye—Mixed Substantive. 588,182. Ignaz Rosenberg, Biebrich, Germany, assignor to Kalle & Co., some place.



First Breaker Woolen Card No. 3.

M. A. FURBUSH & SON MACHINE CO.,



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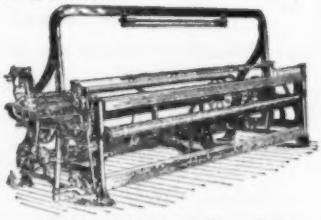


Blanket Loom No. 128.

Dye-Reddish-Violet. 588,181. Ignaz Rosenberg, Biebrich, Germany, assignor to Kalle & Co., same place.

Dyeing Anilin Black. 588,388. Victor G. Bloede, Catonsville, Md.

Knitting Machine. 588,398. S. S. Cook, Philadelphia, Pa., assignor to the Branson Machine Co., same place.

Loom Shuttle Box Operating Mechanism 588,494. B. Smith, Paisley, Scotland.

Lever-Screw for Spinning Frames. 588,273. S. M. Hamblin, Taunton, Mass., assignor to the Mason Machine Works, same place.

Loom Shuttle Cop-Skewer. 588,179. C. F. Roper, Hope Dale, Mass., assignor to the Draper Co., same place.

Spindle Driving Mechanism. 588,235. W. T. Noah, Durham, N. C.

Woven Stiffening Fabric. 588,301. E. K. Warren, Three Oaks, Mich.

Woven Stiffening Fabric. 588,302. E. K. Warren, Three Oaks, Mich.

Automatic Drop-Wire Support for knitting machine stop motions. 588,762. A. White and D. F. Sullivan, Lowell, Mass.

Gin Feed for Roller Compresses. 588,812. C. L. Bessonette, Waco, Texas.

Knitting Machine Needle Dial. 588,559. H. Eddishaw, G. E. Knowles and John E. Eddishaw, Philadelphia, Penn.

Knitting Machine Stop-Motion—Circular. 588,760. A. White and D. F. Sullivan, Lowell, Mass.

Loom Picker Stick Bearing. 588,660. Harry M. Schadewald, Philadelphia, Pa.

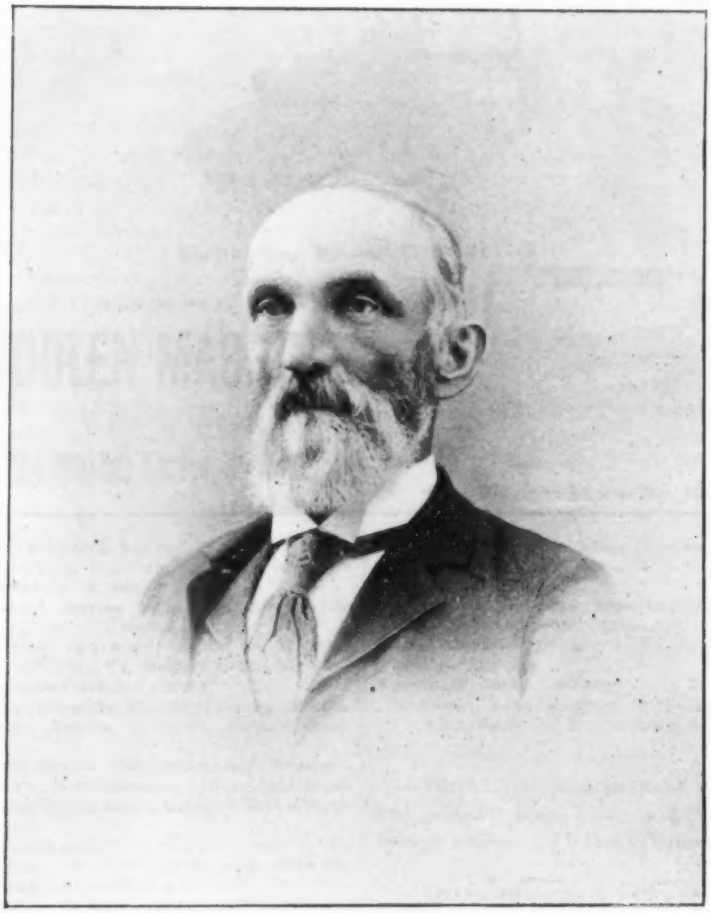
Loom Shuttle. 588,935. A. Wood, Ramsbottom, England.

Spinning Ring. 588,817. G. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

—There is no actual standard violet, and probably there never will be, although such would be very desirable.

—The spectral violet is not characterized by any great brilliancy or luminosity, but it is rich in chemical activity.

—As the result of the gold boom many inquiries have been made at the Interior Department, Washington, D. C., regarding the laws applicable to Alaska, as far as lands and claims are concerned.



JAMES J. REGAN.

TEXTILE WORLD.

Vol. XIII. SEPTEMBER, 1897. No. 3.

JAMES J. REGAN.

The manufacturing community of central Connecticut were shocked and saddened to learn of the death of James J. Regan, of Rockville, Ct., August 6, in the sixty-third year of his age. Mr. Regan's death was sudden, due to heart failure. Mr. Regan had attended to his affairs at the mill on the day of his death, and was seated at his desk conversing with his son, Frank, upon a matter pertaining to the business, when he suddenly fell back in his chair and expired.

He was widely known throughout New England as a manufacturer of fine shoddies, woolen cloths, and knit goods. He operated two large mills, employing in busy times nearly three hundred persons. For the past three years business has not been very good, but he kept his mill running in hope of better times, that hope seeming about to be realized. His death is a decided loss to the business community.

About thirty years ago Mr. Regan invented a flock cutting machine which was a great improvement upon anything in existence at that time. For a while he operated this machine at the Windermere, Rockville, renting power, but realizing its possibilities, resolved to go into the business of making flocks used at that time largely in making cloth. Finding that he needed more room for his business which could not be obtained there, he removed his mill to Daleville in the town of Willington, where he continued for about five years. Disaster overtook him, and he failed. It is said to be for Mr. Regan's credit that later, when again prosperous, he paid his creditors in full, one hundred cents on the dollar.

About 1875, Mr. Regan again started in the shoddy business in Rockville. New processes of manufacture made the business profitable, and it was gradually increased. At one time he purchased looms, engaging in the manufacture of horse blankets for which there was found a ready sale. The death of Cyrus White threw in the market the valuable manufacturing plant known as the Glasgow mill, Rockville, consisting of a four story brick structure. This plant was purchased by him, and to his shoddy business he added the manufacture of knit goods, and woolen cloths.

Some fifteen or sixteen years ago he purchased the property known as the Barrow's place, from J. J. Robinson, on Prospect street, Rockville, for a residence. He made extensive improvements about the property, making it one of the most attractive residence places in the city.

Mr. Regan was a man of the strictest integrity, and no one stood higher in the esteem of his business associates. He was an ardent Republican, using his influence for his party, but was never an office seeker. He was prominent in all town and city affairs, usually being seen and heard at the town and city meetings where his voice was always in favor of the economical expenditure of the public money. The only public office held by him was that of fire commissioner under the town government of fire department.

Mr. Regan was a life long temperance man, having taken the total abstinence pledge from Father Matthew when but 9 years old. He was prominent as an advocate of total abstinence; one of the organizers of St. Bernard's Temperance Society, of which he was a member for nearly thirty years; one of the promoters and

organizers of the Catholic Total Abstinence Union of Conn., and held office in both. He was a member and liberal supporter of St. Bernard's church, and contributed liberally to various charities. He took a great interest in young men, and has helped many with advice and assistance.

Mr. Regan married, when quite young, Miss Mary Jane Wilber, of Coventry. Mrs, Regan died about ten years ago. Five children survive. Francis J., who was associated with him in the business; Herbert, Sylvester, Mary J., wife of Thomas H. Kehoe of New Britian, and Miss Belle.

Nearly all the manufacturers and prominent business men of Rockville, were present at his funeral, as well as the help employed in his mills and hosts of friends and acquaintances. The floral offerings were many and beautiful, including pieces from St. Bernard's T. A. B. Society, Court Snipsic F. of A, the overseers of the mill, the employees, and many others. The large church was filled to its utmost capacity, testifying to the universal respect and esteem in which the deceased was held. The burial was in the family lot in St. Bernard's cemetery, Rockville.

Recent Sales of Mill Shares.

	Lowest.	Highest.
Barnard	88	88
Border City	118	118
Mechanics	78	87½
Sagamore	103	103
Cocheco	205	210
Lyman	70	70⅛
Manchester	98	98
Pacific	1960	1960
Wamsutta	95	95
Bourne	118	118
King Philip	98½	98½
Sanford Spinning	90	90
Shove	105	112½
American Linen	102½	102½
Cornell	115	115
Merchants	105	105
Osborn	105	105
Slade	40	40
Weetamoe	62½	62½
Bates	113	113¾
Everett	70¾	70¾
Lawrence	116	116½
Massachusetts	94¾	95
Pepperell	325	325
Laurel	93	93

—We notice in one of our foreign exchanges quite an article on the introduction of the cashmere goat into this country, which speaks of the efforts of J. D. Davis, of South Carolina, as something of recent occurrence. We desire to correct our contemporary by saying that Mr. Davis has long been dead, and that the importation of these goats is now purely a matter of history.

—The number of basic brown dyes is very limited; Bismarck Brown, the earliest of coal tar browns, and Tannin Brown, one of the latest dyes to be introduced, practically exhaust the list. The former has proved itself very useful, and by combining it with other basic dyes, various shades of brown can be obtained.

—Prussian blue as an acid color on wool was found to be perhaps the fastest of all blues to light. A medium shade did not fade perceptibly during the whole year's exposure. Unfortunately, however, it is naturally sensitive to alkalies. However, all these blues seem to be specially serviceable for some purpose or another and even an indigo blue has its well-known faults.

—The dyer is accustomed to produce most of his broken tones, sages, bronzes, olives, etc., by mixing various red, yellow and blue dyestuffs together, and it is really astonishing the great variety of shades which a practical colorist can produce by means of a few judiciously selected dyestuffs.

—Perhaps the first pure-bred Southdowns were introduced in the United States, about the close of the last century. A Philadelphia paper of that period announced the arrival of some of these sheep that were purely bred.

—American cotton seed has been planted in the locality of Shanghai, China, but the result has not been satisfactory, because the seed is not given the test it receives at home.

—The question as to whether an "acid" or "neutral" oleine is preferable is one which must be settled by considering the special purpose to which it is to be devoted.

Textile World

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COMBINING

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AND THE

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WALTER B. GUILD,
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THE TEXTILE WORLD'S COMPLETE DIRECTORY OF THE TRADE.

(350 pages with 19 maps)

Containing full information about all

COTTON MILLS, WOOLEN MILLS,
KNITTING MILLS, SILK MILLS,
DYE WORKS, PRINT WORKS,
BLEACHERIES,

also lists of

Dry Goods Commission Merchants,
Dealers in Raw Materials,
Manufacturing Clothiers,
Suit and Cloak Makers,
Jobbers and Large Retailers,
Buyers from First Hands.

Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

Change of Publication Date.

Hereafter, the publication date of the TEXTILE WORLD will be about the 1st of the month, instead of the 15th, as heretofore. Matter intended for publication and copy for advertisements, etc., must be received on or before the 20th of the preceding month, and to insure proper classification and submission of proofs, it is advisable that copy should be sent in by the 15th.

NEW YORK WOOL SALE.

The much advertised first sale of the first series of wool auctions at the New York Wool Exchange, was held on August 18, and the concensus of opinion is that it was a most decided failure, with scarcely a redeeming feature for encouragement for future sales, except as it may be present in the mind of the optimist. There has been nothing said or published, coming within our observation, that has been otherwise than in severe criticism of the methods pursued and the general results of this first effort in selling wool at auction. Of course, failure in this instance does not necessarily mean failure in a future one, because it must be acknowledged that the management had to deal with a radical innovation in the methods of disposing of wool to the trade. The effort was a tentative one, and many of its objectionable features will unquestionably be eliminated in subsequent sales, and many weaknesses corrected. There are prejudices to be overcome, and more than anything else, a familiarity with this system of selling wool must be cultivated on the part of manufacturers and others. There was a not unreasonable awkwardness about the proceedings on the part of the auctioneer and audience, notwithstanding the fact that many in the latter were more or less acquainted with auction methods governing the proceedings of such sales as occur at Antwerp, Liverpool, and, especially, London. The whole affair was one of timidity on the part of those offering

and those who came to purchase wool, and the many withdrawals of lots (a thing universally criticised) was, in a measure, natural. Much of this will be rectified as auction sales become more frequent. The success of auction sales in this country must be the result of a long period of education and experiment. It can hardly be expected that the trade will jump into an innovation of so radical a nature as this all at once. It will require time and patience to effect any desired end in this respect.

There were 386 lots of wool catalogued, that the majority of manufacturers and other buyers supposed were offered in a bona fide way for actual sale without any withdrawal contingency. Only 136 lots, however, were sold, which we have tabulated below, showing the number of lots of each class of wool and the range of prices at which they were respectively disposed of. We also present a table, giving an idea of the size of the lots that were sold. It will be seen that comparatively few of the lots amounted to over 10,000 pounds each, and a number of lots were 500 pounds or less. The prices, except in rare instances, were unsatisfactory, even as gauged by the prevailing market prices.

Australian Crossbred	16	lots	at	24 at 26½	c.
Fine Spring Texas	7	"	"	11½	"
Medium Texas	2	"	"	11 " 11½	"
Fine Medium Texas	4	"	"	8½	"
Scoured Cape	11	"	"	24 " 45	"
Texas and Territory	42	"	"	9½	"
Pulled	10	"	"	15½ " 40	"
South American Scoured	4	"	"	35 " 40	"
South American Crossbreds	7	"	"	18 " 40	"
South American Merino	4	"	"	10 " 16	"
Kentucky and Indiana Combing, Crossbreds, Etc.	13	"	"	11½ " 22	"
New York Unwashed	4	"	"	17½ " 19	"
Miscellaneous	12	"			
	136	"			

Lots under	500	Pounds	19
" "	1000	"	30
" "	2000	"	20
" "	5000	"	32
" "	10000	"	13
Lots over	10,000	"	22
			136

There are many things against the success of this system of selling wool, and the conditions affecting the success of auction sales abroad do not exist in this country, the most potent one being that there is not such a large clientele here as is found abroad. We have here only a domestic demand, while in London the auctions have the whole world to draw upon for customers. We can see no element for encouragement for the immediate success of auction sales in the United States, at New York, Boston, or elsewhere; nor do we have any fear that this, or any other effort that may be made, will lessen the importance of Boston as the chief wool emporium of this country. Notwithstanding the assurance of the president of the Wool Exchange that the latter is not an association for the building up of the local wool trade of New York alone, but that it is national rather than local in its character and object, the belief is well founded that it is almost purely local, and that its national feature is simply in the imagination, subservient to a local gain.

The second sale of the series is taking place while this magazine is going through the press, which prevents us from commenting upon the results of the second attempt.

COTTON CONSUMPTION IN THE SOUTH.

Many of our Southern contemporaries have favored us with their comments upon an editorial that appeared in our August number, relating to the consumption and scarcity of cotton in the South Atlantic States, especially to our conclusions that when the local consumption reaches sixty or more per cent. of the production, the advantages possessed by Southern over Northern mills will cease to exist, so far as the cost of the raw material is concerned. We further stated, which some of our Southern critics do not take to kindly, that sixty per cent. consumption, as noted in regard to North Carolina, practically means that the mills are forced to seek outside sources of supply to meet their wants. The criticisms that have been made to

our statements have consisted purely of sentiments, without the presentation of a single fact in refutation.

There is no denying that, at the present time, there is a slight advantage possessed by Southern over Northern mills, in the cost of cotton at the factory, but the difference in favor of the former, even on the average percentage of the local consumption of the crop, of 33 per cent, as shown by us, is very small. Whether our statement is correct or not, can be easily verified by ascertaining the prices paid for cotton at the mill centres, such as Augusta, Columbia, Spartanburg, Charlotte, etc., and comparing them with those paid for cotton, including freight, bought by Northern mills, in other sections. Prices of cotton at these centres are too high to induce Northern mills to buy. The local demand is so great that the Northern manufacturer cannot touch the prices; and it is often the case that the local price is as high as that for cotton laid down at the factory door in New England. The neighborhood planter gets the benefit of all this. When Southern mills are obliged to go for their cotton away from their immediate neighborhood, it is a question whether they have any advantage at all, over their Northern competitiors in the price paid for cotton, due to the relatively high (local) freights that have to be paid. This matter of freight has been brought out very clearly in the late discussion in the Southern papers concerning this position of affairs, showing that the local rates have not been lowered, except in a few instances, and those slightly, within the last four years, while lower through rates have been accorded to cotton for Northern mills.

The Southern mills, in order to receive any advantage in the cost of their raw material, must depend upon their neighborhood supplies. Should they go out of this area of supply, it is doubtful if they would be as well off as the Northern mills, on account of local freight rates; and in order to diversify the cotton manufacture of the South, much of the cotton supply must be obtained outside of the South Atlantic States. We are confining our remarks wholly to the manufacturing industry of that section. There is one thing worthy of note, that the Northern mills have the whole Southern country, from Virginia to Texas, to draw upon, and take advantage of any abnormal conditions that may prevail affecting the cost of transportation. These abnormal conditions occur not infrequently, and Northern manufacturers are in a position to take advantage of them. These conditions seldom, if ever, occur to the benefit of the Southern mills. We will cite an instance at this present moment, of cotton being taken from the port of Galveston and delivered in New York at two cents a hundred pounds. Exception may be taken to this case in point, because it is irregular, but this unusual state of affairs is not so very uncommon, though, perhaps, not so radical. We believe that to-day, Northern mills can lay down their cotton at their factories at a less price than can Southern mills at their factories.

We do not mean to say that Southern mills have no advantages over their Northern competitors. What we say, is, that they do not lie in the cost of the raw material so much as many people are prone to think. The great advantage of the Southern mills over those of the North, lies in the lower cost, and longer working hours, of labor. To this may be added the lower cost of building material. There is no material saving in the cost of coal, except in the immediate neighborhood of the coal mines. In fact, Pocahontas coal, for instance, can be laid down at the New England seacoast manufacturing towns at a less cost than to the mills in the interior of the South Atlantic States. The Southern mills, also, have the benefit of a remarkably capable native white population to draw upon for factory help. The white help of the Southern mills is fully, to say the least, as capable in the way of efficiency, as that which exists in the North.

When our Southern contemporaries criticise our statements, we would be

under obligations to them if they would substantiate what they have to say, by giving facts in refutation.

MASSACHUSETTS MANUFACTUING STATISTICS

The 1896 statistics of Massachusetts manufactures, issued by the Bureau of Statistics of Labor, has just made its appearance. We have taken from this report the statistics relating to the textile industries of the State, and have tabulated them as below, in comparison with those for 1895, showing that 1896 was not so favorable to the textile manufacturing industries of the State as the year of 1895, while the latter year was better than 1894. As will be seen, the proportion of business done for 1896, was only 68.25 per cent. of the full capacity of the carpet manufacturing industry, 77.33 per cent. of the cotton, 57.26 per cent. of the knitting, 69.5 per cent. of the woolen, and 70.3 per cent. of the worsted industry. The knitting industry was particularly depressed, and it was not much better in 1895. In order that certain features of the table may be better understood, we will give an illustrative example relating to the manufacture of cotton goods, as follows:

Value of goods made	$87,146,604
Less value of stock used	50,297,985
Industrial Product	$36,848,019
Paid in Wages . . . $25,865,194	
Plus Profit and Expense Fund . . . 10,982,825	
	$36,848,019

In the statistics relating to cotton goods, it will be noticed that while the value of goods made was less in 1896 than in 1895, the cost of the stock used was considerably more, leaving to the manufacturer only 29.81 per cent. of the industrial product, against 39.51 per cent. for 1895, out of which he had to get his profits. It may be well to state, so that there may be no misunderstanding, that the term capital does not mean merely cash capital, or capital stock, but includes all the forms of capital devoted to production, and is made up of the following items: value of land, if owned; value of buildings and fixtures, if owned; value of machinery and motive power, if owned; value of implements and tools (not included under machinery), if owned; value of patent rights, patterns, etc., if owned; value at cost of the material and articles to be used in the industry, including, also, goods in the process of manufacture; and all cash on hand or in the bank. The aggregate amounts given as capital invested in the different industries include all actual capital of every form available, or in process of production in the industries at the time of making the statistical returns.

Industries.		Amount of Capital Invested.	Value of Goods Made.	Value of Stock Used.	Industry Product.	Total Amount Paid in Wages During the Year.	Profit and Minor Expense Fund.	Percentage of Industry Product. Devoted to Profit, etc.	Percentage of Industry Product. Paid in Wages.	Average Yearly Earnings.	Average Number of Days in Operation.	Proportion of Business Done. Percentage
Carpets	1895	$ 6,608,497	$ 7,213,708	$ 4,396,556	$ 2,857,242	$ 1,700,080				$ 470.38	300.63	77.50
"	1896	6,690,495	5,674,032	3,362,805	2,371,727	1,414,172				470.38	300.63	77.50
Cotton Goods	1895	106,141,614	87,146,604	50,297,985	36,848,019	25,865,194	10,982,825	29.81	70.19	333.36	270.53	77.33
"	1896	112,062,812	87,146,604	50,297,985	36,848,019	25,865,194	10,982,825	29.81	70.19	333.36	270.53	77.33
Knit Goods	1895	4,477,439	6,433,901	3,376,471	3,056,430	1,905,080	1,151,350	37.67	62.33	308.50	257.78	57.26
"	1896	4,208,270	5,014,755	2,406,106	2,608,649	1,718,086	890,563	34.14	65.86	311.14	257.19	57.26
Woolen Goods	1895	21,952,897	24,989,560	14,130,166	10,859,394	6,887,101	3,972,293	36.57	63.43	328.27	266.26	69.55
"	1896	19,186,201	19,006,182	11,303,040	8,260,142	4,993,616	3,266,527	39.55	60.45	328.27	266.26	69.55
Worsted Goods	1895	15,740,666	15,620,046	11,153,063	7,466,983	4,600,167	2,866,816	38.39	61.61	365.17	276.64	85.56
"	1896	15,363,869	17,827,246	10,861,320	6,966,926	4,279,222	2,687,704	38.57	61.43	365.17	276.64	85.56
All Industries	1895	350,952,763	309,000,021	315,273,242	302,272,295	139,915,252	44,117,369	39.85	60.15	425.39	301.56	92.56
"	1896	373,852,101	327,720,294	302,272,295		129,013,272		44.75	55.25	425.16	276.43	68.98

THE FIRST COTTON FACTORY.

A tablet has been placed on the site of the first cotton mill in America, in No. Beverly, Mass. More or less has been written about this pioneer factory, as if there was a dispute as to its proper position in the history of cotton manufacturing in this country. Many have in their minds that the old Slater mill at Pawtucket, R. I. has been recognized in history as the first cotton manufacturing establishment erected in this country. This is a wrong impression, and there is no good reason for its existence. The old cotton factory at Beverly, has always been recognized as the first establishment of its kind in America. The position that the Slater factory at Pawtucket, holds in history, is that it was the beginning of cotton manufacturing in this country according to the Arkwright system, dependent upon the inventions of the eighteenth century that revolutionized the mechanical processes of manufacture. The Slater mill has the credit, to which it is justly entitled, of being the beginning of cotton manufacturing as it is understood to-day. All writers upon this subject have recognized the above facts, and we can but refer to such works as "Cotton Manufacture of the United States," by James Montgomery, 1840; "Cotton Manufacture," by S. Batchelder, 1863; and the more recent, and perhaps the most authentic, "History of the Textile Industries of the United States," by W. R. Bagnall.

NEGRO OPERATIVES.

The subject of the employment of negro operatives in Southern cotton mills has been pretty well discussed in the columns of the press throughout the country, and very little that is new can be said concerning it. The labor question is always an important one in any manufacturing community, whether it refers to white or colored help. It is our impression that the fact of negro labor existing in the South will be a potent means for blocking the schemes of white labor agitators, such as is manifested in the Northern States. No one desires to see labor depressed, or a low state of living common among factory operatives, but strikes, lockouts, and other forcible means are to be deprecated as methods for attaining ends. The Southern manufacturer has the negro element to fall back upon, in case the white operatives lend themselves to the influence of professional labor agitators. The employment of negroes in the Fulton Bag & Cotton Mills, at Atlanta, was, after all, of little moment, and far from being of such a serious character as depicted in a number of our exchanges. However, it is perfectly natural and right that the white and negro operatives should be kept separate, certainly in the present status of the two races.

—It is very gratifying to learn through such an excellent authority as C. P. Brooks, director of the Textile School, Lowell, Mass., who has just returned from a trip in Europe, that the collection of machinery in the Lowell school is much better than that to be seen in the schools abroad, which leads him to say that with three years more of experience and training, the Lowell school will be able to turn out young men as thoroughly equipped as any that are graduated from the foreign institutions.

—A certain number of representatives, more or less connected with The American Cotton Growers' Protective Association, of which A. T. Lane, of Alabama, is president, met recently at Galveston, in answer to a call from the governor of Texas, for the purpose of taking steps to put a stop to the selling of cotton on future contracts, as practiced by the cotton exchanges, or, as it is otherwise called, gambling in cotton. The meeting was a failure, and any efforts in this direction are likely to prove failures, so long as the selling of futures is not conducted in a worse manner than at present. Nothing ever has been shown, that is worthy of consideration, that would stamp the present methods as a con-

summate evil to the detriment of the planting interest. On the other hand, it has been demonstrated quite conclusively that were it not for the system, the fate of the planter would not be so agreeable as it is to-day. The planter has always an excellent opportunity to dispose of his crop at any moment that he sees fit, which would not exist were it not for the system that is thus condemned.

—We referred in our May issue to certain advances that have been made in the spinning of cotton yarn on the bare spindle, on the ring frame. This appears, from a recent communication that we have received from England, as a most promising invention; but, in some attempts which have been made to carry it into practice, a number of unexpected disadvantages have been met with, as has been found in oth r instances of this kind.

—Would it not be well for our knitting manufacturers to consider the advisability of turning their attention more to the product of fancy knit goods, instead of running so much upon staple articles? There is a demand for fancy hosiery, which dealers are obliged to seek in foreign markets, but which, it would appear, the domestic manufacturer should supply. This applies to plain and ribbed knitting.

MILLS ARE STARTING.

It has become very evident to all, and especially to those who are in receipt of our Weekly Advance News sheet, that there is a most decided improvement in wool manufacturing throughout the country. It is something that this industry has been sadly in need of for a number of years past, and it is surprising that manufacturers have been able to hold their own, financially, so well as they have, and that there have been so few failures. Mills are starting up in all directions, and new mills are already planned for immediate construction. There are prospects of at least six mills going up in the State of Rhode Island, alone, while enlargements and additional machinery are now, or about to be put in operation. Some mills are running over time, and one mill in Rhode Island and one in Maine are operating their machinery day and night, while in a few instances we note an increase in wages.

Cotton mills are not feeling the returning tide of prosperity so favorably as the woolen mills, but their day of activity is again near at hand. Cotton mills that have been shut down for one reason and another are restarting. We note a continued tendency toward diversifying the cotton industry in the South. One mill in North Carolina, for instance, is contemplating the manufacture of narrow fabrics, and a cotton lace concern is projected in Pennsylvania.

There is confidence in the knitting industry. We record a number of mills that have been idle that are starting up, and enlargements and additional machinery are contracted for. Quite a number of new knitting mills are being put up in Pennsylvania, and some in the West and South. The silk manufacturing industry is seeking the South for locations. An investment of a million dollars is being considered by Paterson parties for a silk plant for North Carolina, which will give employment to 1500 people.

EGYPTIAN COTTON.

The cultivation of Egyptian cotton in the South is still in its experimental state, the same as has surrounded it for a number of years. Experience has demonstrated, thus far, that the Egyptian seed does not take as kindly to the soil of this country as to that of Egypt. Deterioration sets in, even in the first year's planting, and under even better than the ordinary conditions of planting. Evidently, the best localities for the growth of the seed is in the bottom lands of the Mississippi Valley, and in the southern counties of Texas. We have recently received from the director of the experiment station at College Station, Brazos County, Texas, information to the effect that the soils of that State,

thought to be the best adapted for its perfection, have proved inadequate to a satisfactory production, either in quality or yield, except in rare instances, where the rich alluvial land of the river bottoms have been tried. Yet, even under the most favorable conditions, it is found to be unprofitable, because of two factors, which may change, in the opinion of the director, in the course of time. First, the negroes dislike to pick this cotton, because of its small bolls and "spiny sections" that prick his fingers; and second, because the price obtained for the lint has not justified the additional cost of cultivation.

EFFECT OF THE TARIFF ON WOOLENS.

We have recently received a communication from a Western firm, handling woolens, inquiring about the effect of the customs tariff upon the price of the domestic product. The firm writes us as follows:

"We send you two pieces of cloth, about which we desire to know if an increase in price on these goods is warranted on account of the new wool tariff. These goods are made especially for our branch of trade, and we know of five or six mills competing for the same trade, and the competition is fairly brisk. Some mills are taking orders for such fabrics up to January 1st, next, at old prices, and as our business is steady the year round, we see no occasion for any advance, except for the increased price of wool, unless the removal of foreign competition may give the domestic mills a chance to raise prices on their own account. We are interested to know about how much the increased price of domestic and foreign wools would add to the cost of producing these cloths. Foreign (English) goods have been selling in the American market for the past year or two in competition with this domestic cloth, though the foreign article seems not quite so good, and has taken only a small share of the American trade, possibly 10 per cent. The goods in question weigh eight ounces per square yard, both qualities. One piece (a) is 69-70 inches wide, and has cost us 50 cents per yard; and the other piece (b) is 68-69 inches wide, and has been costing us 65 cents per yard."

There are only two points in our correspondent's communication that are necessary to be taken into consideration, and these are weight and cost. As the domestic cost alone is given, we are obliged to assume the foreign cost, upon which the ad valorem duty is figured.

The tariff law of 1894, applicable to these goods, imposed a duty of 40 per cent. ad valorem on goods valued under 50 cents a pound, and 50 per cent. ad valorem on goods valued at over 50 cents a pound.

The tariff law of 1897, just passed, imposes a duty of 33 cents a pound and 50 per cent. ad valorem on goods valued at not more than 40 cents a pound; and 44 cents a pound and 50 per cent. ad valorem on goods valued at over 40 cents and not above 70 cents a pound.

It will be seen that the goods are nearly two yards wide, and they weigh, practically, one pound per running yard. We assume that the foreign cost of one (a) piece is 38 cents per yard, and the other piece (b), 48 cents a yard.

Under the 1894 act, a duty on "a" piece would be 40 per cent. of 38 cents, or 15.2 cents per yard, and on "b" piece, 40 per cent. of 48 cents, or 19.2 cents a yard, making the cost of the "a" piece plus the duty in New York, say, 53.2 cents a yard, and the "b" piece 67.2 cents a yard.

Under the 1897, or present act, the duty on "a" piece would be 33 cents plus 19 cents (50 per cent. of 38 cents), or 52 cents a yard; and on "b" piece, 44 cents plus 24 cents (50 per cent. of 48 cents), or 68 cents, making the cost of the foreign article, landed in this country, 90 cents for the "a" piece and $1.16 for the "b" piece.

The protection that is furnished by the tariff to the domestic manufacturer can be readily seen, and we will leave it to our correspondent to figure out to his own satisfaction. We ought to state, which our correspondent already knows, probably, that the pound duty is a compensatory one for the duty on wool.

In regard to the increased cost of the domestic product, on account of

the advance in the value of wool, we will simply say that wool that could have been bought at 42 cents, clean, the 1st of January, commands, to-day, fully 56 to 58 cents a pound. Taking into account the loss in process of manufacture, the cost of the wool in the goods might be reckoned at 58.4 cents upon the price prevailing in January, and 77.7 cents upon the price prevailing to-day, per pound. To reconcile this cost of the wool with the stated cost of the cloth (50-65 cents per yard, or per pound), it may be well to say that the cloth in question is cotton warp and woolen filling. The tariff, however, makes no distinction in the imposition of a duty between all wool and cotton warp goods.

With the above figures, we leave to our correspondent the task of figuring out the advantages that the domestic manufacturer has under the 1897 act, over those which he had under the 1894 act. The factor of competition, however, in the cost to him of the domestic product, must, of course, be taken into consideration in his ability of obtaining goods at a low price. We are pleased to note in our correspondent's letter that American goods seem to possess merits superior to the foreign.

A COTTON TRUST.

There is expressed a fear on the part of many of our Southern exchanges that the American Cotton Co., which is interested in presses making cylindrical bales, will soon resolve itself into one of the most powerful trusts in existence in this country. The fear, apparently, is largely due to the fact that some of the prime movers in this company are closely associated with the affairs and fortune of the so-called sugar trust.

Of course there is more or less danger of over-bearing exactions on the part of any business corporation which has back of it large capital and a monopoly, but it is very clear that, in order to carry out the proclaimed purposes of this company, which no one can say are improper, large and active capital is absolutely necessary. The cotton trade has been cursed for a great many years with poor baling and lack of uniformity in the size of the bales. Many efforts have been made to correct this fault by attempted concerted action on the part of cotton exchanges, but nothing has ever been accomplished of much moment. The prospect now is that something toward this end may be accomplished through the efforts of the American Cotton Co. The cylindrical bale itself has reached a stage where its popularity seems to be assured among manufacturers, and, for aught we know, among transportation companies.

It certainly shows a step forward which promi-es, within a comparative y short time, to revolutionize the whole system of baling cotton. In some respects the form of the square bale is preferable to the round, but the latter has advantages, discoverable more particularly at the mill, in the picker room. Of course, it is to be hoped that no evidence of a trust or an overbearing monopoly will arise from the American Cotton Co. Such a state of affairs would be deplorable, as resulting in great injury to the planter, the manufacturer, and to all concerned.

Some of our Southern exchanges say that a fight ought to be made at once against this company, while it is comparatively weak, and before it is allowed to get strong. Of course this is anticipating evil, without evidence of the likelihood of its existence. No antagonistic plan of action is suggested, however, by our contemporaries. We expect to see a large amount of good derived from the fact that a large amount of capital is back of this new movement, that will stand as a guarantee for uniformity in the size of cotton bales, and for the correctness of classification in the cotton received by the consumer.

Many claim, very truthfully, that the compression of the square bale can be brought to the density of the round bale. While this is so, it might also

be said that the covering could be made equally as satisfactory, but we know as a fact that this has never been done, and, according to the way things are now conducted, never will be. Some complaint has been made concerning the difficulty of sampling cotton put up in the round bale, but a communication in our last month's issue, ought to satisfy unbelievers in this respect, that this is a disadvantage that does not exist, and that sampling, if necessary, can be accomplished as readily as with the square bale. But an important point is that with the guarantee of the American Cotton Co., sampling becomes unnecessary.

THE BUSINESS SITUATION.

It does not require us to tell our readers that business is better, as they are quite as well aware of it, no doubt, as ourselves. There is a feeling, and a substantial one, that the gain in business is a permanent one, to last, at least, for a number of years. The only fear that is expressed is that it may be so rapid and become so unduly inflated that a crisis will be the final outcome. There is plenty of statistical evidence which shows that the amount of merchandise that has been moving of late has been much larger than many people have been aware of. This is better told in statistics relating to the business of railroad companies in the United States, which we are able to obtain from the recently published annual manual by Poor, the best authority that we have. It appears that there was an increase of one per cent. in the number of miles of railroad operated in 1896 over 1895, and the number of tons of freight moved was 2.5 per cent. greater; the number of passengers carried, one per cent. greater; and there was an increase of 3.6 per cent. in the earnings from freight; 1.7 per cent. in the earnings from passengers, or a net earning from all sources of 3.25 per cent. These of themselves show that there has been an under current of improvement right along, and that but few have been aware of it. The increase has been gradual, and especially favorable. The principal cause of improvement must be found, we think, in the fortunate condition which our cereal crops are in, especially wheat, when considered with the deficit that exists in other lands, and which we are called upon to supply. The wheat crop of this country is acting as an important a part in our business affairs as did that which preceded the good times of 1880 and 1892. According to the Corn Trade News, Liverpool, a most excellent authority, the world's supply of wheat for 1897 is about the same as that for 1896, but the distribution of the supply is altogether favorable to the United States. There is a deficit in the wheat crops of Europe of 200,000,000 bushels, as compared with the crop of 1896. This deficiency must be supplied from the North American Continent, principally the United States, and our present crop of 550,000,000 bushels, against 470,000,000 bushels of last year, will be needed to supply a portion of the want. This will put the Western farmers in good financial circumstances, which will be felt through all the avenues of trade, in time.

The production of gold that will follow the discovery of the deposits in the Klondyke region will contribute largely to the improvement in trade. With these natural conditions in connection with our protective tariff, there is a happy prospect before us.

--According to the statistics showing the exports of textile machinery from England to foreign countries, Japan is looming up as an important country in the development of manufacturing. For instance, the value of this class of machinery exported to Japan for the seven months ending with July, amounted to $625,000 in 1895, against $2,400,000 in 1897. This is a fair indication of what may be expected of this most enterprising oriental country. The development of the textile and other industries in Japan is rapid, and in some respects, magnificent.

The Shanghai Cotton Mills.

The following list of cotton spinning mills in Shanghai and other parts of China, with the number of spindles actually in position, and the projected additions, has been compiled by Messrs. Noel, Murray & Co., of Shanghai:

	Spindles. Projected.	Running.
In Shanghai.		
Ewo Cotton Spinning and Weaving Co., Ltd.	50,000	10,000
Laou Kung Mow Cotton Spinning and Weaving Co., Ltd.	25,000	9,240
International Cotton Manufacturing Co., Ltd.	40,000	24,800
Soy Chee Cotton Spinning Co., Ltd.	40,000	20,000
Hua Sheng Chong Cotton Cloth and Yarn Co.	65,000	63,000
Ta Sheng Chong Cotton Cloth and Yarn Co.	25,000	23,000
Chang Kee Cotton Mill	15,000	15,000
Chinese New Cotton Spinning Co.	15,000	15,000
Yu Yuen Cotton Mill	42,000	24,000
Total in Shanghai	317,000	204,040
Elsewhere in China.		
Tung Kau Yuen Mill, Ningpo	10,000	10,000
Hupeh Government Cotton Mill	30,000	30,000
Wuchang Cotton Mill	50,000	20,000
Soochow Cotton Mill	30,000	—
Wusieh Cotton Mill	10,000	10,000
Hangchow Cotton Mill	10,000	—
Total in Central China	457,000	274,040

The Hua Sheng Chong Company has 750 looms supplied by the Lowell Machine Company, United States, but only 70 of them are at work. The Chinese New Cotton Spinning Company has 200 looms, and the Hupeh Government mill has 1000 looms. In the last two cases the looms are of English make. Altogether it appears that there are 1950 power looms in the Chinese cotton mills.

Test of Bullet-Proof Cloth.

At Fort Sheridan, near Washington, D. C., quite recently, a test was made of the bullet-proof cloth invented by Casimer Zeglen, the Krag-Jorgensen rifle being used. The test was a triumph for the cloth, and the officers who were present declared that the cloth had fulfilled all the claims made for it by the inventor. The test was made under the personal supervision of Col. Robert Hall, of the 4th Infantry, the commandant of the post. A piece of the cloth, 15 by 24 inches and 1 1-2 inches thick, was stretched across one of the ordinary silhouette targets, representing the figure of a man standing. The cloth was composed of five layers of equal thickness, the weight of the piece being about eight pounds. The firing began at a distance of 400 yards, the first bullet striking squarely in the centre of the cloth. The bullet went no further than the first layer of the cloth. It was picked out with the fingers, looking very much like a small toadstool. At 300 yards the bullet penetrated to the second layer of cloth, but was smashed out of shape. At 250 yards the second layer was perforated and the third penetrated. At 200 yards the fifth layer of the cloth was struck. The officers present admitted that the bullets were stopped, but say the cloth in its present shape is too thick to be of any service to a soldier save as a shield.

Wool Imports—1892-93.

AN IMPORTANT ERROR.

An error of considerable magnitude has been discovered in the treasury statistics relating to wool imported for consumption in 1892-93. The chief of the Bureau of Statistics reports to the Treasury Department that in going over the figures for that year, it was discovered that wools of Class 3 imported in the fiscal year 1892-93 were reported to have been 133,197,581 pounds. These figures are too high by 26,302,000 pounds, an error to that amount having been made in entering the imports for immediate consumption at Philadelphia in the quarter ending December 31, 1892. The total imports of Class 3 wool in 1893 should have been stated at 106,895,000 pounds.

The change made necessary by this discovery will result in raising the average value per pound of wool in 1893, as given by the Bureau of Statistics. The error was made in pointing to the figures received from Phil-

adelphia. Attention is called to the correction, in view of the importance of comparisons to be made with wools of the same class imported for consumption in subsequent years.

Mill Statistics.

State Labor Commissioner Mamrick, of North Carolina, has completed his compilation of mill statistics for his State, and says there are 206 cotton, 17 woolen and 2 silk mills, total 225, with 1,030,000 spindles and 23,000 looms. Gaston leads in spindles, having 113,000, Mecklenburg having 84,000 and Rutherford 80,000. There are mills in 47 of the 96 counties. In the number of factories Gaston leads with 22, Alamance having 20, Randolph 18, Mecklenburg 16. Rutherford has the largest mill, with 74,000 spindles and 24,000 looms. Surry county has one-third of all the woolen mills. The mill employing the most operatives is the Henrietta, in Rutherford, which has 530 men, 665 women and 345 children. This mill company has lately purchased the Forest City mill, and is putting in 12,000 spindles and 400 looms.

Removing Dust from the Carding Room.

At the Ravensburg Spinning Works, at Bielefield, the dust produced by the cards is drawn off by a strong current of air (produced by an exhaust fan) through a grating below each machine, and conveyed through suitable channels into a tubular filter. This latter is so arranged that it can be brushed out several times daily by a series of brushes and the dust delivered to a special collecting chamber, where it is packed into bags for removal and disposal. The purified air is conveyed from the filter back into a conduit arranged along the ceiling of the carding-room, and re-enters the room properly distributed. A branch pipe on this conduit, leading into the open air, can be opened or closed at will by means of a throttle valve, and a portion, the whole, or none at all of the air from the filter allowed to escape, according to the season (spring, summer, autumn or winter). The Moller filters employed for this work indicated, after a year's working, a resistance of two-fifths to four-fifths of an inch on the water gauge. No difficulty was experienced in cleaning them. The power required to purify an average of 282,500 cubic feet (8000 cubic metres) of air per hour is 5 h. p., and as the incoming fresh air is warmed previous to its admission, the temperature of the carding-house is always agreeable, even in the depths of winter.—[Leipziger Monatschrift.

—Sixty firms of Zurich, Switzerland, have inaugurated a crusade against the fraudulent weighting which has done so much to destroy the silk industry, and have agreed with dyers that nothing which will deteriorate the fabric shall be used, no matter from whence the order may come. A board of control has been appointed, and the dyers deposit a certain sum, to be forfeited in case of transgression.

—About 50 years ago the beginning of the present firm of Platt Bros. & Co., of Oldham, Lancashire, Eng., originated with the grandfather of the present head of the firm, who was a skilled workman. From a humble beginning, this firm now employs about 14,000 workmen, and is the largest machine shop for cotton and woolen machinery in the world.

—The factory secrets envolved by German skill and talent are more sedulously guarded, in Germany, than ever, and new barriers are constantly raised to prevent the entrance of foreigners into the factories or the far-famed technical schools, which have had so great an influence upon German industrial success.

—William Harper, chief of the bureau of information of the Philadelphia Museums, who recently returned from a trip abroad, reports having met with great success in his endeavors to extend the scope of the Museums.

Profitable Wool Growing.

A good authority says: "There is every probability that the worsted manufacturer will long be able to afford remunerating prices for any quantity of good, servicable combing wool which the world may be capable of producing."

The above is in its way very reassuring, and is just as true to-day as the day it was written. There are, however, one or two little words that must be read carefully, viz: "good," "serviceable," etc. In these rushing days we don't seem to pay enough attention to detail, but rush everything through, when by a little extra care we might be not only able to obtain better prices but we should be in a better position to cope with this great emergency, viz: "Foreign Competition."

Wool growers should bear in mind the fact that wool, to be fit for combing purposes, and to obtain the higher prices which such wool commands, must possess qualities which, in most instances, can be imparted to it.

The wool most in request and always fetching the highest prices, has a staple from four to ten inches long, according to its fineness, and ought to be as far as possible, uniform in quality throughout its whole length, bright and lustrous in appearance, of good spinning qualities, and free from burs or other vegetable fibres.

These are three points which are of the greatest importance, viz: (1) The desirability of obtaining the whole natural length of the staple, by only clipping the lambs or sheep once during the season's growth, as frequent clippings, more than anything else, tends to deteriorate the quality and depreciate the value of otherwise good and useful wool. (2) When sheep cannot be pastured all the year round upon succulent grasses, a constant supply of artificial food will prevent the staple from getting tender. (3) The sheep should be well washed before they are clipped, and the fleece properly soaked and cleaned.

The quality of wool is said to depend on the yolk, which is a compound of potash and lime and animal matter that imparts to wool its characteristic odor. The saturation with yolk gives wool the silvery lustre so much desired; and how far art can supply this copious secretion, and what effects extreme heat and cold has upon its production, are very important questions. Yoik also contributes to that valuable quality in wool, **density.**

In wool washing on the sheep's backs, rain or soft river water should be used, and if the washing was performed with successive small quantities of water, in baths through which the sheep could be passed successively, the maximum quantity of water would suffice, and the valuable potash now wasted, which forms from seven to eight per cent. of the gross weight, would be saved.

Mr. Raspail estimates that the grease from French wool-washing would manure 370,000 acres; and on the continent the potash, worth about 3c. per pound, is, in wool-washing and scouring operations, carefully saved.

We cannot do better than quote from G. H. Cox, member of the legislative council of New South Wales, and an eminent agricultural authority there. In a practical lecture delivered by him Mr. Cox observes:

"Having touched upon the principles that should guide the sheep breeder, I cannot conclude without a short statement with respect to the fitting up of the article produced for the market. My experience goes to prove that however carefully you may breed your sheep, and however superior the wool may be which they grow, your returns will be disappointing, unless the greatest attention is bestowed upon the washing of your dip. Every one who has judiciously expended money upon the necessary plant for spout-washing his wool, will truly admit that the returns are one hundred fold. Some number of years ago (1875) our sheep owners were anxious to obtain the opinion of English manufacturers as to the general getting up of their wool, and the

sorting of their fleeces. We used to get periodically the broker's stereotyped report, 'that so many bales of wool were sold, that the attendance of buyers was limited or otherwise, that some bales were seedy and others tender,' all of which we knew, and, knowing, could not remedy; but we could never learn what the manufacturers said about it, whether it contained too much or too little yolk; too dry from over washing, or too heavy from under washing, etc., etc., etc. Well, we engaged the services of a gentleman who went through the cloth manufacturing districts, and who supplied us with much valuable information which we utilized, and which I shall now be happy to impart to others. Our directions were, never to use water for the soak beyond 110 degress, Fahr.; never to use alkalies, such as potash, soda, or hard soap; but any quantity of soft soap might be used, in fact using it was merely a matter of dollars and cents, but that all alkalies destroyed the fibre of the wool, making it harsh and dry, and, what the manufacturers say, making it work unkindly. The great object in washing wool is not only to make it white,, but to make it bright. After leaving the spout the fleece, when squeezed by the hand, should pull out again, not feeling sticky, and should glisten in the sun with peculiar brilliancy; if too little yolk be left in the wool it will be wanting in softness; if too much it will be sticky, and after a time, turn yellow."

The desirableness of this brilliancy in the wool is that manufacturers of merinos, delaines, and other light fabrics will give extreme prices for it, as this bright wool only will take delicate dyes. Between well washed and badly washed wool in this respect there is as much difference as between a polished silver plate and a wooden trencher.

F. M. M.

—Violet is a color which is found at the end of the spectrum opposite to the red.

American Silks.

About 75 per cent. of the silks worn by American women are of American manufacture. In this branch of industry the question of supremacy appears to have been firmly and finally settled. Unlike the men, who, in demanding that their clothes be made of imported woolens, betray their ignorance of the high quality of the cloths produced at home, the well-dressed women of the United States have accepted American silk on its merits and are wearing it in preference to the imported fabrics, not because the silk is American, but because it is cheaper and better than imported goods that sell at the same price.

A writer in the New York Sun remarks that "at the silk counters of the large dry goods stores you seldom hear a women ask: 'Is this American or foreign silk?' Women are, as a rule, excellent judges of style, pattern, finish, and quality, and it is happily true that in all these particulars, as well as in price, the silk goods of American manufacture are able to hold the home market against foreign competition."

"The dress silks," says the same writer, "that are imported are mainly those of the more expensive grades, in the production of which hand labor is employed extensively. By reason of the proportion of cost represented by labor, always much better paid in America than in Europe, there is no inducement to manufacture such goods in this country. Velvets for costumes and cloakings are also imported extensively. The labor engaged in the manufacture of pure silk velvets in Europe has become specialized and highly skilled by long training in this branch of work, and while some excellent velvet is made in America, the product does not average so high in quality as that which comes from France and Germany. In the cheaper grades of silk for dress materials, ranging from 50 cents to $1.50 per yard, there is virtually no foreign competition. Nowhere are these fabrics

produced so cheaply and in such excellent quality as in America. The only imported element entering into their manufacture is the raw silk yarn that comes from Japan and Italy, so that labor remains the principal item of cost in production. Silk culture has not proved successful in America, though it is not improbable that in some parts of California the silkworm may be propagated profitably. Sixty-five years ago a member of the Cheney family of silk pioneers instituted a series of experiments in New Jersey with a view to starting from the mulberry leaves and the silkworm as the basis of production, but owing to unfavorable conditions of climate the attempt was not directly successful, though it laid the foundation for the establishment in later years of the silk industry upon its present firm basis."

"American women," said the manager of a large silk house, "now accept without queston the fact that American silks are all right. There is no longer any prejudice against the domestic article. In ribbons and velvets for the trimming of hats and dresses, American goods have the field pretty much to themselves. The only things in this line that are imported are a few extremely fancy ribbons. The power looms used in America, and indeed, most of our special machinery processes, are in advance of those employed in the silk factories of Europe. Our dyes are finer than those abroad, and there is no limit to the variety of American colors. The color card of a Paterson factory contains more than 200 distinct shades of color. The roller process of printing silks, which was first perfected and introduced by the Cheneys, is ahead of anything in France or Germany. There are factories over there where you can see the printing done by the slow process of hand stamping. The American roller machines, now in general use in this country, do the work much better and twenty times as rapidly."

Many of the designs for printed and woven silks originate in New York City, says the Sun's informant, and in their creation give profitable employment to a considerable number of clever men and women. The art is remunerative in proportion to the popularity of the designs produced. At certain seasons agents of the silk factories visit the jobbers and some of the larger retail establishments and take orders on the designs furnished by the artists in the form of paintings in water colors showing every detail of drawing and color exactly as it is to be reproduced in the silk fabric. If the design goes well with the women, the artist is handsomely paid on the basis of a royalty which varies with the number of colors used in the design. Upon gelatine plates—a separate plate for each color—the design is reproduced, and it is then transferred mechanically to the metal cylinders through which the plain silk fabric is run, very much as white paper is reeled through a big newspaper printing press, though much more slowly. As the printed silk leaves the cylinder wet with the fresh colors it is passed upward through a tower heated to a temperature of 200°, and in this way thoroughly dried. The cloth is subjected to a bath, in which all of the surplus color is washed off, and then is dried and finished for the market. To such perfection has the printing process been developed by American ingenuity and skill that many of the printed silks show scarcely any difference between the right and the wrong sides of the cloth.

—The condition of the workman in this country should always be better than that of his European brother, so long as the country is less densely populated.

—There is in this country no virtually insurmountable social barrier which places and keeps our workmen within the bounds of life-long poverty.

Angora Goats.

One of the most lucrative industries in the Karoo districts of South Africa, is Angora goat farming, and although it has only been established for less than forty years, the Cape bids fair to become the most important centre of mohair production in the world. The early attempts to import this goat from Angora were attended with great loss of money and great disappointment, nearly all the goats dying either on the way to the Cape or very soon after landing; in fact, of the early importations only a very small number survived. But in 1879, a large importation was successfully made by three different firms or individuals, who landed a large number of pure-bred Angora goats at Port Elizabeth, where they were sold at from $500 to $2000 apiece. Soon after that, the exportation of Angora goats from Turkey was prohibited for a time; but in 1894, Mr. Rhodes obtained the relaxation of this prohibition. Early in 1895, a shipment of 200 Angora goats, after being quarantined, was sold at Port Elizabeth at an average of $250 apiece, some of the rams selling for as much as $1500 each. At present there are somewhere about 4,000,000 Angora goats in the colony. According to a Cape Colony authority, the Angora in the colony is not now pure-bred; the original imported rams were crossed with carefully selected pure white Boer goat ewes, and from the succeeding in-breeding the present flocks have sprung, and a fine, glossy, silky fleece secured. Indeed, it is accepted that mohair can now be produced in Cape Colony as perfect in quality and as beautiful in lustre as any produced in Angora itself. The goat itself is a pretty-looking little animal, looking, with its long white, wavy fleece, more like a sheep than a goat. The beard, too, so characteristic of the goat, is almost hidden in the long hair about the neck and face. The head is small and narrow, with drooping or lop ears. Horns—light in color, flattened, twisted slightly and spreading outward—are possessed by both rams and ewes, though they are smaller in the latter. The small body is thickly covered with a beautiful long fleece of white, lustrous, wavy, silky hair, which, in well-bred goats, nearly reaches the ground; and, in addition to this long hair, there is an inferior under coat of hair, or second coat, which has its own separate market value. The Karoo and higher lands of the colony are the places where the Angoro flourishes best. Almost every farmer in the Karoo has his flock of Angoras, some several flocks of several hundred in each. Every morning the flocks are driven out of kraals or sheltered inclosures into the veldt, where they are allowed to wander and graze all day, but at night they are driven back to the shelter of the kraal after being taken to the dam to be watered. Angoras are sheared about June, when a good fleece will average from five to six pounds in weight, with hair from five to six inches long. About November the goats tend to shed their hair, but rather than lose it the farmer again shears in October. After shearing, the wool is packed into large bales, which are fastened securely with iron bands; it is then exported to England for manufacture, a large part going to Yorkshire. In 1895, mohair to the value of $3,500,000 was exported, and at the present time, one-tenth of the total British supply is received from the Cape. Among the most dreaded foes of the timid little Angora are the jackal, the red lynx and the baboon; the two former kill the kids for their flesh, but the baboons rip open the udders of the ewes in search of milk, and even open the stomachs of the kids for the sake of the curdled milk they may obtain. The first two animals are poisoned and hunted down with dogs where possible, and to keep down the baboon, shooting parties are frequently organized. By way of encouraging the extinction of these pests,

the Government pays 3 shillings a tail for jackals and 1 shilling a tail for baboons.

The raising of Angora goats in Africa and in other foreign lands, directs inquiry into the efforts, in this direction, that are being undertaken in the State of Maine, U. S. A. We have the report that experiments are being made in the newly cut but uncleared lands of northern Maine, by one, Major Charles J. House, of Augusta, who is securing leases of wild lands and hiring goat herders. According to Major House's theory, as reported to us, there is more money in goats than in sheep. A sheep is doing well if she raises one lamb in a year and brings it up to a salable age. A goat brings forth young twice in a year, producing two or three at a birth, and can be relied upon to rear three young ones every season. Since the price of wool went down, the pelt of a fat kid is worth as much as a lamb's skin with the wool on it, while the meat of a young goat is fully as good to eat as that of a lamb. Sheep are subject to many diseases, the flocks are constantly raided by dogs and wild animals, and the farmer who would grow sheep for profit must build barns, buy provender, and make a great outlay for hay. Goats are hardy, cropping the sprouts from stumps in the clearing, eating coarse hay, and enduring all kinds of weather without harm. The billy goats in a flock are able to keep the dogs and bobcats away. For these reasons, Major House proposes to turn the great raspberry and blackberry wilderness of Maine into a goat pasture, stocking a half million acres of land with approved breeds of goats, and putting them in charge of goat herders, who must attend the flocks, cut meadow hay to carry them through the winter, and cull out the young males for market as fast as they grow. The females will be kept for breeding purposes for a few years until the waste territory is occupied. The company, with which Major House is connected, will start out with about 500 goats and two herders. If the experiments succeed, the Major hopes to have 100,000 goats at the end of this century, and thinks the company will get a net cash profit of $1 a head for every goat.

Industries of Ireland.

HER MANUFACTURES.

Those who have travelled through Ireland, visited her agricultural districts, observed her industrial habits, and the characteristics of her people, must have noticed that she is, in a sense, a poor country, practically without manufactures except for the linen and ship building of the North and the brewing and distilling about Dublin, dependent upon agriculture, with her soil imperfectly tilled, her area under cultivation decreasing, and a diminishing population without industrial habits or technical skill. This is clearly seen in the official statistics, showing that the area under cultivation in 1875 was 5,300,000 acres, while in 1894 it was less than 5,000,000 acres. The population in 1841 was over 8,000,000, while to-day it does not reach 4,600,000.

Arthur Balfour said in a recent speech, that he had learned while he was in Ireland that many of the ills of the country were from its poverty, and that this poverty was in part the work of England and Scotland. Not only is the poverty thus accounted for, but in a large measure, also, the temper and habits of the people in respect to industry, the lack of enterprise and perseverance, and the thriftless ways which seem to have characterized them throughout the greater part of this century. Throughout the last century, before the days of steam, Ireland, with her excellent natural resources, was felt by Great Britian to be a formidable rival in commerce and manufactures, but as the result of injudicious legislation her industries have been crushed, not only in the woolen branch, but in almost every other. The fact that such a rival could be maintained at any period of Irish history shows that the people of

that country possess high capacity for industrial enterprise, and there is no reason why this should not be brought into a productive activity. In regard to legislation, we have only to refer to the historical accounts of the navigation laws passed in England, prohibiting, among other things, the importation of Irish cattle into England as a "public nuisance." We can only refer to the accounts of this state of affairs by such writers as Lecky, Froude, and others. If the ambition of the Irishman lay in the paths of manufacture and commerce, he was almost compelled to emigrate on account of restrictive legislation. They were not at one time, at least, without capacity in the pursuit of manufactures, as it is well known that the Catholics went to France and the northern part of Spain, where they laid the foundation of a manufacture highly prejudicial to England. The Protestants, also removed into the Protestant States of Germany, where they were received with open arms, and also into France, where, notwithstanding the Edict of Nantes, Louis XIV received them kindly and protected them in their religion. These Irish emigrants, Catholic and Protestant, so much improved the woolen manufactures of France as not only to supply themselves, but to vie with the English in the foreign markets.

A great deal of information has been thrown upon this condition affecting the industries of Ireland, by the recent publication of the investigations of a committee appointed by Parliament to look into the advisability of establishing for that country a department of agriculture and industries. We are indebted for the report to the Department of State, Washington, D. C. The evidence given before this committee by Belfast manufacturers, shows that the linen trade in Belfast is falling off in competition with Belgium and France, one cause of which is the superior technical training given on the Continent, which enables manufacturers there to turn out a continuous supply of new and attractive designs, and to avail themselves of new processes of working the yarns. Whether Ireland will ever become a manufacturing country on a large scale is a question which the committee did not feel capable of determining, but left its solution to future developments; still, the matter cannot be allowed to pass without pointing to other countries on the Continent such as Switzerland, Belgium and Wurtemberg, which have inferior natural resources to Ireland, and a less favorable geographical situation, which have developed great industrial wealth. Should the day arrive when Ireland's industrial system supplies a corps of industrial leaders, equipped with such technical knowledge as will enable them to understand how the industrial capacities of a country may be turned to account, and the population capable of furnishing these leaders with craftsmen and operatives of requisite skill, it may be said, without being unduly sanguine, that there are hopes in this direction.

According to the last census, made in 1890, the number of persons engaged in the following pursuits, were linen, 88,503; woolen, 5,338; cotton goods, 2,331; lace, 574; silk and silk goods, 379; total, 97,115.

According to the views of the Parliamentary committee, the great fact to be dealt with concerning Ireland, is that agriculture is now not only the main, but, over the greater portion of the country, the sole Irish industry. Out of it must arise its other industries, which, whatever the economical future of the country may be, must form the basis of the industrial structure. It being, moreover, the industry in which the greater proportion of the working population is actually engaged.

Taking the flax crop into consideration, it is a well known fact that it has always flourished and is still cultivated to a large extent in Ireland; still a market exists, due to the home demand, for four times the quantity that is now produced. Foreign flax to the amount of £2,500,000 was imported into Great Britian and Ireland, in 1894. A large portion of this

money might have been earned in Ireland. It is not a question of cheaper production abroad. Notwithstanding this, the area under flax in Ireland has been diminished at the following rates: 305,000 acres in 1864; 130,284 acres in 1887; 113,652 acres in 1889; 96,896 acres in 1890; and 67,487 acres in 1893. Unfortunately, the linen trade in the United Kingdom has been suffering from foreign competition for a number of years, and although this does not account for the decline of flax-growing in Ireland, for the demand for Irish flax is still about four times the supply, it is related to the general question under our consideration. The import of foreign yarns (and this, be it understood, is distinct from the import of flax) has grown steadily from 3,336,874 pounds in 1875 to 19,011,986 pounds in 1893. The exports of yarns in the same period have fallen off from 27,887,681 pounds in 1875, to 16,259,300 pounds in 1893. The number of spindles going in the United Kingdom in 1875 was 1,473,800; in 1890 (the latest returns) the number was 1,134,813. In the year 1893 there was a diminution of 7 per cent. in the export of linen manufactures as compared with the previous year, and in 1894 there was a diminution of 5½ per cent. as compared with 1893, the export in 1894 being the smallest on record. The decline in the cultivation of flax is itself one of the principle disadvantages which are affecting the home linen trade. This decline is traceable to two causes: scarcity of labor, and the absence of technical skill. J. D. Balfour, at the meeting of the Flax Supply Association in 1894, said: "The real stumbling block ahead (to the Ulster linen trade) was that they could not get enough Irish flax." He added that he did not believe the reluctance of the farmers to grow more flax arose from unwillingness on their part, but "because there was a difficulty in getting hands to steep the flax and attend to it at the critical moments." The scarcity of labor here referred to, is plainly one of the results of emigration, and is an indication that emigration from non-congested districts of Ireland has now reached a point beyond which it cannot go without serious detriment to the country. For the decline in the production of flax is but a part of the general decrease of tillage throughout Ireland already referred to, which seems due to the same cause, the diminution in the amount of labor available for application to the land.

The decline in the linen trade is largely owing, among other causes, to the spread of technical education on the Continent. This fact seems to be largely in evidence and frequently referred to and dwelt upon in the report of this special Parliamentary committee. Perhaps it would be well to bear this in mind by those who are endeavoring to encourage the cultivation of flax in the United States, and the important bearing that it has upon the development of the linen industry in this country.

As to technical knowledge, flax is a highly technical crop, calling not only for the employment of a great deal of labor, but for an exceptional amount of special skill. This, the farmers of the south and west of Ireland do not now-a-days possess, nor even the farmers of Ulster, when compared with those of Holland and Belgium. it would be one of the duties of the proposed Department of Agriculture to take measures to impart it to them, by importing skilled instructors from the Continent to prove practically the undoubted benefits to be derived from adopting the present continental methods. The British Government did at one time take some steps in this direction. It granted £2,000 in 1864, £3,000 in 1865 and 1866; £2,000 in 1867; £4,000 in 1868; £3,000 in 1869; £2,000 in 1870; and £1,000 in 1871, to the Royal Dublin Society and the Royal Agricultural Society of Ireland for the purpose of sending out instructors to teach the best methods of growing and saving flax. But this proceeding appears to have been but another illustration of how easily good money may be wasted if sound principles do not govern its expenditure. The royal commissioner on technical instruction

was of the opinion that the failure of this effort to introduce flax was largely due to the ignorance of the home instructors employed.

That flax is a remunerative crop for the Irish farmer; that it is not an exhaustive crop, if it be given its due place in rotation; and that other parts of Ireland are quite as well fitted for its cultivation as Ulster, are points that may now be regarded as beyond controversy. The prospect of spreading the cultivation of flax through the other provinces is governed by three conditions. First, the other provinces are better fitted for the cultivation of flax than Ulster. Secondly, in two of them, at least, labor is more plentiful. The third is an unfavorable condition, namely, the absence of technical skill.

Rival Compress Companies.

The American Cotton Company, it appears, has a competitor in the Standard Cotton Co., which has a plant in practical operation, so stated, at Marlin, Texas, and intends, in due course, after the completion of its organization with ample capital, to establish plants at all important points throughout the cotton growing states in order, it says, "to handle the bulk of the cotton produced, and with its superior system of handling cotton, will certainly be in a position to offer better service and greater inducements to all parties interested in the fleecy staple than are possible under other existing patents." The Standard Cotton Co. repudiates the statement that the American Cotton Co. owns and controls all the round bale press patents, for patents, it says, have been issued and still others are pending in the United States patent office, which are not only not owned or controlled by the American Cotton Co., but are considered by many experts far superior to all other patents issued up to the present time. The patents controlled by the Standard Cotton Co., form a complete system, it is claimed, of handling cotton from the farmers' wagons, in the seed, to the finished cylindrical bale, which is continuous in its operation, and as much cannot be rightfully claimed for any of the other patents issued, as they necessitate a stoppage of from ten to fifteen minutes after the formation of each bale.

If the claims of these two companies are acted upon, there are law suits for infringement sure to come.

Fibre Machinery.

There appears, as an appendix to the valuable descriptive catalogue of useful fibre plants of the world, by Charles R. Dodge, special agent in charge of the office of fibre investigations, U. S. Department of Agriculture, a most excellent and timely article on fibre machinery, which we think will be of sufficient interest to our readers to warrant its republication in these columns, especially as the edition of the catalogue is very limited, and its distribution, consequently, will be very small.

In countries like the United States, where the rates of wages are on so different a plane from the prices paid for labor in countries like China and India, the success of new fibre industries is largely dependent upon mechanical means for extracting the raw product after the crop has been grown.

Cotton cultivation in the United States only began to be extended after the invention of the Whitney cotton gin, and in like manner the establishment of the sisal hemp industry outside of Yucutan has only been possible since two or three improved automatic machines for separating the fibre have been placed on the market.

The production of China grass, or ramie, in many countries is so dependent upon the settlement of the machine question that not a pound of commercial fibre is produced in these countries, although, as in the American Gulf States, the plant thrives in the proper soils, and the machine question has been before the people for thirty years. What is true of the cotton, the sisal hemp, and the ramie industries is true of other possible American fibre industries, not except-

ing the production of hemp and flax, the fibre of which the perfecting of several special machines would largely aid in extracting.

In China the fibre of Boehmeria is extracted by hand, and the partially degummed "grass" can be laid down in New York City at six cents per pound. In India the best of jute is thrashed off by the ryot who stands waist deep in a pool of stagnant water, and it can be sold in New York for three cents per pound. American farmers, who are used to the finest agricultural implements that can be produced will never resort to old world primitive methods—nor can they afford to do so—and the machine becomes the most important factor in the problem.

It is a little surprising in this age of invention that the machine used for scutching flax in many countries today, if machine it may be called, is older than the invention of the steam engine by Watt. The scutching mills in Belgium are supplied with this appliance. Through the rooms, from end to end, run a wrought-iron shaft to which are attached, at intervals of a few feet, systems of wooden beater-blades, which revolve rapidly. The workmen stand in small compartments partitioned off from the room, but open on one side, the flax being presented to the action of the wooden blades through a bevel-edged slit in the side of the partition. The blades as they revolve, strike the already broken flax, held firmly in the hand, knocking out the shive or waste matter, when the opposite end is cleaned in the same manner.

The fibre of flax surrounds a slender stem, straw-like or sometimes woody, which, by retting, is easily broken, and the filaments partially separating from the crushed bits are readily freed from them by the operation of beating. A perfect machine, therefore, would be one that would break the straw or wood into fragments without injury to the fibre, separating the long filaments from all waste matters perfectly, doing away with hand labor, and accomplishing the work without waste of fibre and at an economical cost. It would seem a simple proposition, but from the fact that none of the many improved machines that have been brought to public notice have been generally adopted by mill men, and the old-fashioned berth scutching described above is still practiced even in this country, we may infer that the machine scutchers are not fully practicable. These differ in form and the manner in which they operate as well as in the quality and quantity of flax produced, but they need not be described here.

An improved scutching machine to prepare the fibre for market is a desideratum, but two other machines are needed in establishing the flax industry in the United States: an economical thrasher to save the seed without injury to the straw, and a flax-pulling machine to do away with the laborious and costly operation of hand pulling. Several machines have been invented in the latter classes, but there is room for improvement in flax thrashers, and the flax-pulling machines are still in the experimental stage.

It is not important in the limits of this paper to record here the consecutive history of ramie-machine invention in America, particularly as it would necessitate describing almost a score of machines that, one after another, were brought to the attention of the public for a time, only to be practically abandoned when it was proved that they were unable to fulfil the claims of their inventors. Since 1867 the persevering effort to produce a satisfactory machine has naturally resulted in a gradual improvement in mechanical construction and substantial progress has been made, though at this date (1896) the question has not been practically settled. Ramie machines may be divided into two classes: (1) Delignators, or simple bark strippers, and, (2) Decorticators, which not only remove the bark, but make some pretense of removing the outer pellicle or epidermis and the layer of cellular matter covering the fibre layer proper. The bark strippers produce the fibre in the form of flat

ribbons, only the wood of the stalk being eliminated, and they are usually constructed with some form of knife or knives, with which the stalks are split before being subjected to the action of the breakers and beaters. The decorticators usually first crush the stalk by means of metal rollers, presenting the flattened mass to the action of the breaking or beating devices; and frequently there is a system of mechanisms for combing the fibre before it is finally delivered to the aprons. The product of the delignators is always the same, a flat ribbon of bark, whether the dry or green system of decortication have been employed. The product of the decorticators, on the other hand, is almost as variable as the machines which turn out the fibre. In some of the poorer machines this product is little more than a mangled strip of bark, neither a delignated ribbon nor decorticated fibre, but something more fit for the trash heap. In the best of them, individual filaments, by the green system, somewhat resemble China grass, though darker and less clean, while by the dry system the fibre is already soft enough to spin into coarse cordage without further manipulation. Between these two extremes every quality of "ribbon" is represented. Taking China grass, or commercial ramie, as the highest form of the fibre, since it is degummed with a loss in weight of only 15 to 30 per cent., it will readily be seen that the value of the machine-cleaned ribbons to the manufacturers must be in exact ratio to the degree to which the cleaning and freeing from gum have been carried.

We have considered that these varied products, or grades of product, differ only in the degree to which the elimination of the gum and waste matters have been carried, and that the proportion of gum, cellular matter, and epidermis is the only consideration. In point of fact, the product of many machines which otherwise might be called "good fibre" has been so filled with fragments of the woody portion of the stocks, or so "chewed up" by harsh treatment, or, finally, so snarled and tangled in the delivery that it has had little value for any purpose. The product should be delivered straight, unsnarled and untangled, free from chips, and without breaks, cuts, or bruises, whether in the form of stripped bark or semi-cleaned fibre, and its value will be determined by the percentage of pure fibre it contains. It may be fairly assumed, then, that the nearer a machine approaches in its product the ramie of commerce, Chinese hand-cleaned fibre, the higher the price of its product, and the more desirable the device producing it as an economic agricultural implement.

Hemp and jute machines may be classed together, as a successful bast-fibre machine might with slight modification be made to extract either fibre. It has been shown, also, in ramie-machine trials, that an unsuccessful ramie machine may prove a fair jute machine, and two machines the Department has tested have worked on the three fibres, hemp, jute, and ramie.

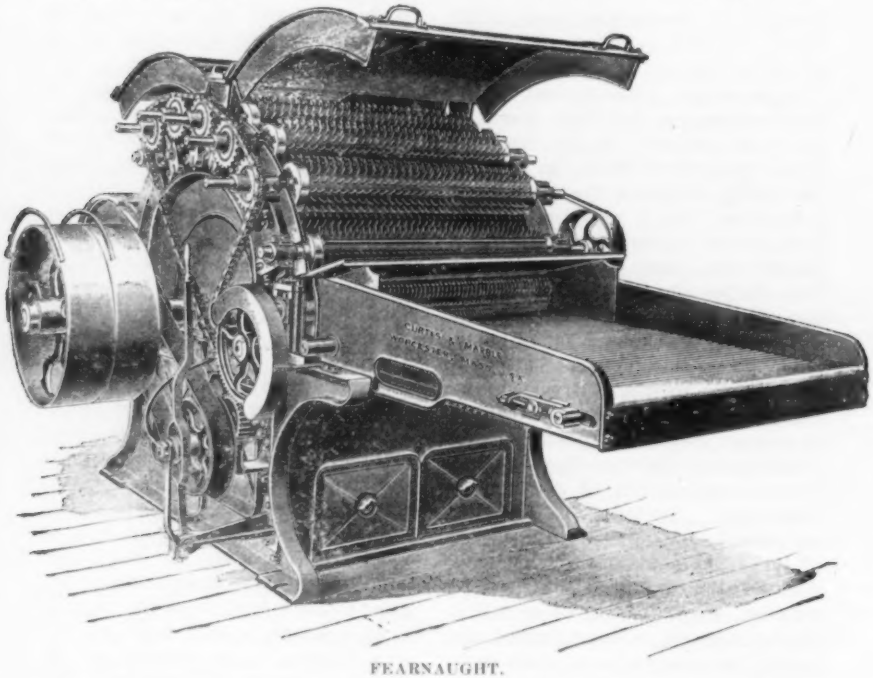
It is claimed that nearly three hundred patents have been issued in the United States for machines for breaking hemp, many of which have proved absolute failures, while none of them filled the requirements of an economically successful hemp-cleaning device, the Kentucky hemp grower of to-day relying upon the rude and clumsy five-slatted hand brake of his grand-father's time, a device similar in all respects to that used for the same purpose at the present day by the hemp farmers of Brittany. The French brake is only a slight advance upon that used in this country, being smaller, composed of both wood and metal, and having seven instead of five slats. With a less clumsy affair than the American device, a Frenchman cannot clean with it more than half the quantity of hemp in a day that an average Kentucky negro operator produces on the American brake. Thirty to thirty-five kilograms of fibre per day is the limit of production for a single brake on a Sarthe farm, equal to 65 or 75 pounds of fibre. It is more carefully prepared, however.

being twisted into small "streaks" or loose ropes, a number of these making up a bundle of several kilograms in weight, this being the form in which French hemp goes to market. In Kentucky, breaking is an expensive operation, costing $1.00 to $1.25 per hundred pounds of fibre. The work is performed in the winter by negroes, and the best workers will not average more than 150 pounds in a day. A number of patented machines, possessing more or less merit, have been brought to public notice in the past four or five years, several of which have been examined by the Office of Fibre Investigations. The fact remains, however, that while several of the more recent inventions that have been looked into are "promising," the hemp growers of Kentucky do not consider that a perfectly satisfactory machine is available at the present time.

Probably a greater degree of success has been achieved in the invention of machines for extracting of the fibre from such fleshy leaved plants as the Agave, etc., than for any other classes of fibre plants. Several successful machines have been placed on the market which will enable a sisal-hemp grower to market his crops without recourse to the clumsy raspadore used so many years in Yucutan.

Fearnaught, or Wool Opener and Mixer.

The accompanying illustration represents an improved Fearnaught for opening, mixing and preparing stock of all kinds before carding, manufactured by the Curtis & Marble Machine Co., Worcester, Mass. It is similar in principle to a wool card, with heavy feed rolls, large main cylinder, workers, strippers and fan-doffer, and opens the stock by a coarse carding process. The feed rolls, main cylinder and workers are filled with cock-spur teeth, hot forged from square steel, and firmly driven into place, so that the very hardest work may be done without danger of the teeth coming out. Underneath the cylinder is a grating through which the dirt falls, and over



FEARNAUGHT.

the top are iron covers to prevent the stock from flying out. A stop motion is provided for the feed rolls so they may be stopped and started while the cylinder is in motion.

The Fearnaught has no equal for the thorough opening and mixing of all grades of stock. The feed rolls are solid iron rolls, both of them filled with cock-spur teeth intersecting each other, so that they hold the stock firmly for the teeth of the main cylinder to thoroughly open it in taking it from them, and by reason of the very large number of teeth in the cylinder, it gives a constant opening and combing process at the feed rolls; the opening and mixing is still further aided by the action of the workers and strippers.

The Fearnaught does the work with no perceptible injury to the fibre, even of long stapled wools. This is often a matter of great importance, and its gentle action on the stock is due to the principle of its construction and the comparatively slow speeds of its cylinders; at the same time, there is no danger from fire, as with pickers having rapidly-revolving cylinders.

The machines also have a very large capacity; the different sizes which are built are capable of handling from 800 to 2000 pounds of wool per hour, according to size. They also run easily and are practically self-stripping or cleaning in operation. There has lately been added a smaller size than heretofore made, and machines 36″, 40″ or 48″ wide are now built with main cylinders 36″, 48″ or 55″ diameter. The two smaller sizes are the ones most commonly used for opening and mixing ordinary wools, and have a capacity of 800 to 1500 pounds an hour. The largest sizes, with 55″ diameter main cylinder, are used mainly for opening long carpet and worsted wools, and have a capacity on this class of work of 700 to 1200 pounds an hour.

Among those using this make of Fearnaught machine are the following: Sanford Mills, Sanford, Me.; Bigelow Carpet Co., Clinton, Mass.; Merrimack Woolen Mills, Lowell, Mass.; Geo. H. Gilbert Mfg. Co., Ware, Mass.; Assabet Mfg. Co., Maynard, Mass.; Yantic Woolen Co., Yantic, Ct.; Alex. Smith & Sons Carpet Co., Yonkers, N. Y.; C. H & F. H. Stott, Stottville, N. Y.; Waterloo Woolen Mfg. Co.; John Dobson, Philadelphia, Pa.; Conshohocken Worsted Mills, Conshohocken, Pa.; Kiamensi Woolen Co., Stanton, Del.; St. Mary's Woolen Mfg. Co., St. Mary's, Ohio; Old Kentucky Woolen Mill Co., Louisville, Ky.; Mishawaka Woolen Mfg. Co., Mishawaka, Ind., and Beaver Dam Woolen Mills, Beaver Dam, Wis.

Electrically-Operated Loom.

There has been quite recently invented by Massachusetts parties (one an electrician), an electrically-operated loom, which has for its object the running of such a machine electro-magnetically, whereby the parts are reduced in number and simplified in construction, with novel features attached to the shedding and shuttle mechanism. The lay is done away with, and the reed is operated by light and easy running devices, all of which modifications, in the usual construction of the loom, reduces the necessary power for running it. The various moving parts of the loom depend for their operation upon a magnetic field and a coil-armature, one of which is reciprocable relatively to the other, the lines of force of field intersecting the coil of the armature, whereby the production of a current in the coil-armature will tend to cause relative movement of field and armature in a direction depending upon the direction of the current. Reversal of the current reverses the direction of relative movement of the two parts, so that by changing the direction of current in any suitable manner the movement of one of the parts relatively to the other becomes a reciprocation, which is utilized for operating the

loom. The reed is reciprocated back and forth in a horizontal plane from a point immediately in front of the foremost series of heddles to the cloth-making point.

The Russian Cotton Industry.

The cotton industry was established in Russia as early as the 18th century. Without any mills, yarn was distributed among the villages to the peasants, for the preparation on hand looms, of the simple national stuffs in common use. Soon small weavers' shops began to be founded, for twenty or thirty looms, and in the middle of the 18th century, the cotton goods industry began to spread so rapidly among the villages that it even killed the weaving of linen cloth. About the same time the calico printing industry came into existence, at first in the village of Ivanovo, in the Government of Vladimer, where by the end of last century there were already several such manufactories. At the same time it was held that Russian fustians and calicoes were immeasurably superior as regards dyeing to those of Western Europe. From the beginning of the present century the weaving of the coarser calicoes from English yarn began to spread in other places besides the Governments of Moscow and Vladimer, and the demand for yarn so increased that attempts were even made to build spinning mills. The war of 1812 retarded the development of the Russian cotton industry, but already in the seventies, it began again to rapidly develop, later attracting to itself a large number of workmen, and a considerable amount of capital. In the absence at that time of Russian machinery works, it was necessary to apply to England for spinning jennies; on the other hand until 1842, the exportation from England was prohibited and they could only be obtained by smuggling. Notwithstanding all these obstacles, in 1843 there were 40 mills, with more than 350,000 spindles, and ten years later there were nearly a million. The great growth of the Russian cotton goods industry is shown above all by the increase of the imports of foreign cotton into the country. In 1855 it still did not exceed 1,500,000 pouds (1 poud = 36 lbs. avoirdupois), while subsequently the average annual amounts were as follows: 1877-1881, 5,800,000 pouds; 1887-1891, 8,100,000; 1892, 9,400,000; 1893, 7,600,000; and 1894 11,300,000 pouds. This is the cotton brought over the European frontier, but besides this there are 800,000 or 900,000 pouds brought across the Asiatic frontier. Nor is this all; a still more remarkable fact is the establishment of cotton plantations in Russia itself, developing year by year in Turkistan, the Caucasus, and the dependencies of Khiva and Bokara. These plantations in the beginning of the nineties furnished over 3,000,000 pouds, and now probably the amount is considerably exceeded. Such being the progress made by the Russian cotton industry, the general demand of the Russian people for cotton goods is now satisfied almost entirely by the home production. The imports of yarns have diminished to such an extent that they form only 2½ per cent., while the imports of foreign textile fabrics do not exceed a three-hundredth part of the total Russian consumption. It is true that the exports from Russia of cotton goods is still small, they possess a certain importance only for Asia, which consumes every year an increasing quantity of Russian manufactures. In the number of spindles the Russian cotton industry has taken the first place on the continent of Europe. In 1891 there were 6,000,000 spindles in Russia; in France and Germany, 5,000,000 each; while in the other continental countries the numbers were below this. Thus to Russia's share fell one-quarter of all the spindles of the continent, and yet it was seven to eight times less than in England. The industry is protected from foreign competition by the imposition of heavy custom duties. The Russian cotton spinning industry in general does not go beyond the spinning of medium numbers, and is limited to No. 70. The annual average counts are 28 approximately. The English system is adopted for num-

bering cotton yarns, that is the counts are arrived at by the number of hanks of 840 yards each per English pound. These numbers are used for the manufacture of calico, which is finished by bleaching, dyeing, and printing. —[Exchange.

Trade Disputes in Germany.

Trade disputes of the modern type in Germany may be said, speaking generally, to date from about the middle of the century. Three periods in their history may be roughly distinguished, the first from 1844 to 1868, when German workmen were still struggling to obtain a recognition of the right of combination; the second from 1868 to 1878, when the rival organizations of Trade Unionists and Social Democrats were seeking to establish their hold upon the working classes by initiating struggles for higher wages, and the third from 1878 down to the present time marked by less open activity on the part of the Social Democrats, but by an increasing number of strikes, for the most part unsuccessful. Indeed, the labor conflicts since 1868, or during the last two periods, far exceed the total number during the first two-thirds of the century, and this increase is attributed by Dr. Oldenberg mainly to the violent fluctuations of trade occasioned by political conditions and to the consequent necessity for frequent re-adjustments of wages. Prior to 1868, a large proportion of strikes were connected with the desire to assert the right of combination, as yet unrecognized by the majority of German governments. In 1861, this right was, indeed, conceded by the Kingdom of Saxony, but though its example was followed in some of the lesser States, it was not until 1869 that Prussian working men obtained the right. With the recognition of the right of combination, the strike movement entered upon another phase. The beginning of the period from 1868 to 1878 is marked by the rise of organizations, and the era of high prices and large profits which succeeded the Franco-German war afforded a favorable opportunity for their activity. The rise in prices made higher wages necessary, the favorable condition of trade made them possible, and the demand for labor brought with it the power to enforce them. Consequently, the majority of the strikes during this period, including the great strikes amongst miners in the Waldenburg and Essen districts, in 1869 and 1872, were for an advance in wages, combined, in some instances, with the shortening of working hours. Both Trade-Unionists and Social Democrats were anxious to form a labor party, and to show their zeal in the war against the great capitalists. In 1872, "strikes had become a terror to the country, and a constant subject of public discussion," according to the report of the Royal Commission on Labor, recently presented to the British Parliament. We learn from this source that up to 1873 they were, for the most part, successful. Wages rose from 20 to 100 per cent., working hours were reduced in a large number of industries from 11 to 10 or even 9 1-2, though in several cases the workmen had to submit to the substitution of payment by the hour for payment by the day, and they struggled in vain against the growing prevalence of the system of piece-work. Further, the employers had learned by experience the value of organization, and the frequent local strikes were met by equally frequent lock-outs. The ebb in the strike movement soon began to make itself felt, and the blow struck at the Socialist organizations by the law of 1878, combined with the depression in trade, to produce an almost total absence of strikes between 1879 and 1882. In 1882, a fresh movement began, which it required the most strenuous efforts on the part of the labor organizations to hold in check. Wages had fallen during the bad times, and a desire was widely prevalent to strike for an advance. This third phase of the strike movement is remarkable for the tendency on the part of the labor

organizations towards consolidation, in so far as they were not hindered by the Socialist law. This consolidation was the more necessary, inasmuch as it was the only means of preventing a number of purposeless or mutually destructive strikes. Its importance in the development of trade disputes is two-fold; on the one hand, as the organizations themselves claim, it makes for peace by its tendency to prevent the hasty or thoughtless declaration of strikes; on the other hand, the local strike under its influence gives way to the district or national strike, so that if strikes are perhaps fewer in number, their area is more widely extended. In Germany, however, this movement towards consolidation or federation, whether amongst the labor organizations or the associations of employers, can only be said to be in its infancy. Since 1888, it has led to a renewal of the policy of lock-outs on the part of the employers, whom the factory inspector for the Leipzig district regards as forced by the "general disturbance of industry through demands for an advance of wages at a time when trade is in an unsatisfactory condition (1891) to defend their own interests by common action."

The great majority of strikes in Germany are directly connected with the question of wages in one form or in another. Thus, in Alsace-Lorraine, nine out of thirteen strikes in 1891 are assigned by the factory inspector to differences concerning wages. Where the question at issue is not a direct demand for an advance or resistance to a reduction, objection is often made to piece-work, to the introduction of machinery, and to certain systems of fining, that is to say to methods of calculation which the workmen regard as likely to lower the rate of wages.

In 1888, the majority of the strikes are said to be due to demands for higher wages, and especially for a minimum wage, whilst a number of strikes against piece-work are also recorded. In 1889, the same causes are enumerated, with the addition of the introduction of machinery, and in 1880, the method of fining is further added to the list. The women engaged in a factory in the Hesse district struck, in 1888, against the system of payment by the piece, because they found that "according to the new method of calculation they did not obtain the former weekly wages." Though they were obliged by the communal authorities to return to work and to complete their contract, the employers consented to restore the old method of payment.

The year 1889 is remarkable for the strikes occasioned by the introduction of machinery. The iron moulders of Hanover struck because, as they declared, their employer had broken the peace by introducing machines which would enable unskilled labor to drive skilled artisans out of the industry. A similar agitation was caused amongst the workmen in a shoe-making factory in the Palatinate, by the introduction of finishing machines, which enabled 14 workmen to do the work of 30. Since, however, the demand for labor kept pace with the supply, and the workmen employed on the machines were found to be in a better financial position than before, the excitement soon subsided. Strikes in 1890 were concerned rather with the shortening of working hours than with a desired advance in wages; but, in some cases, as, for instance, in that of the Ravensburg spinners, in the district of Minden-Münster, the two demands were made simultaneously. The weavers in the cloth factories of Lambrecht in the Palatinate struck for higher wages and shorter hours, and the employers retaliated by closing all the mills. It was finally agreed that all the employers should pay the highest piece wages paid hithereto, and that if higher wages were paid in competing towns, the employers should engage to pay up the difference. This, however, was not found to be necessary. The textile industry of Alsace-Lorraine was greatly disturbed through-

out the year, but an advance in wages constituted only a small part of the demands of the strikers.

Among the Dry Goods Trade of New York.

Theodore Emery, P. Van Volkenburgh's Chicago agent, has lately been in town.

Denny, Poor & Co. have admitted P. F. Cole as partner.

Catlin & Co. have been appointed selling agents for the Statesville (N. C.) Cotton Mills.

Moses Schloss died recently at his home in this city on his 78th birthday anniversary. He was formerly an Albany dry goods man.

T. W. Tully, until lately with the Rhode Island Bleachery, is now with C. H. Pope & Co.

Heimes & Bishop have just put a new Williston Mills sheeting on the market. It is brown, and three yards. Its trade mark is a cat wearing spectacles.

The common stock of the H. B. Claflin Co. has gone up about 12 points within a month.

William E. Sawin this month finished his 60th year in the employ of Lawrence, Taylor & Co. He began August 1, 1837, with Lawrence & Trimble. This is probably the best record in New York City.

C. W. Fitz and F. F. Reynolds will handle the Maggiori glove account through Abegg & Rusch. They have been with Mr. Floquet for years.

Business has been so brisk lately in the wholesale district that Saturday half-holidays have been largely ignored.

The Tostal-Broadhurst-Lee Co., of Manchester and Bradford, has appointed Abegg & Rusch its selling agents.

Flatz & Ozanne, trimming manufacturers, of Saxony and Bohemia, have been succeeded by Ozanne & Marshall. Mr. Marshall will remain in New York.

Oscar Schoenherr, manager of Fleitmann & Co.'s foreign dress goods business, died suddenly, recently, of apoplexy.

These have returned from Europe: G. F. Simon, of J. R. Simon & Co.; G. Pleissner, of Remy, Schmidt & Pleissner; R. B. Welsh, of Spielmann & Co.; Richard Bondy, of Bondy & Herring; H. R. Gargan, of Speilmann & Co.; M. Wertheimer, of Wertheimer & Co.; A. Kitz, of Bossut, Pere & Fils; Henry T. Sloane, of W. & J. Sloane; W. H. Gill, of W. H. Gill & Co.; E. H. Coleman, of Oelbermann, Dommerich & Co.; Alexander P. Bell, of same concern; E. T. Hesslein, of Hesslein & Co.; E. T. Mason, of E. T. Mason & Co.; W. Kobbe, of Kobbe & Sands; L. E. Craig, of the York Street Flax Spinning Co.; F. Schmidt, of Bossut, Pere & Fils.

These have gone to Europe: H. Oppenheimer, of Oppenheimer & Bonnim; C. S. Spiegelberg, of L. Spiegelberg & Sons; Richard T. Koerner, of Koerner & Co.; J. Odin, of Brunet, Lecomte & Davey.

A. J. Milstead, superintendent of the Tallassee Falls Manufacturing Co., is visiting the market.

H. F. Barry, of Mills & Gibb's handkerchief department, will hereafter represent Thomas Pullman & Co., of Belfast, whom he has gone abroad to see.

Stehli Bros., of Zurich, are locally reported as soon to build silk mills in this city, as an outcome of the new tariff.

It is said that more than one large dry goods importing house sends clerks to the docks on the arrival of European steamers, to see that the custom laws are thoroughly enforced.

Imports of dry goods at this port showed an increase of $2,796,533 for July, 1897, as compared with July, 1896. For the seven months ending July 31, an increase of $30,910,467 is shown.

Of course, there is much disappointment at the result of the wool auction. Too small lots and the withdrawal of catalogued stock were mistakes, but there are too many obstacles for the innovation to be successful at present.

Gustav M. Miller, dealer in woolens, 35 E. 10th St., has got into trouble on the charge of secreting assets.

The Buyers' Association of America has been formed, and permanent headquarters will be opened here. The officers: President, Martin Roman, of Selig, Cooper Co., New York; vice-presidents, C. E. Adams, of Haskett & Co., Chicago; A. B. Daniels, of Aitken, Son & Co., New York; secretary and treasurer, J. A. Kraus, of New York; executive committee, James Ferguson (chairman), of Jersey City, Louis M. Meyer, of New York, C. A. Smith, of New York.

Estimates of the fall and winter buying in this city run all the way from $20,000,000 to $50,000,000. The shrewdest judges, however, give more credit for the increase in business to the advance in cereals, than to rate attractions held out by the Merchants' Association.

Plain faced fabrics in woolen and worsted dress goods have been somewhat less in demand recently. This, because stocks in that line are known to be larger than in most others, affording ample opportunities for a later choice.

Silks are uncommonly active for this season of the year. Taffetas are in the van—plain, many tone effects, fancy brocades, etc. Plaids, Roman stripes, bengalines and Fayadere effects in fancy weaves are among the other leaders.

Rough effects in coarse yarn weaves and bright Scotch cheviot effects for suitings are in excellent demand.

Braid manufacturers are jubilant because their product is so largely in demand for trimmings.

Fancy ginghams and prints are in more general request than for many months past.

The lack of positive novelties in the market was never more marked. The cause of this is doubtless due to tariff uncertainties.

It is worthy of note that buyers from the smaller cities fight shy of bengalines, while large city dealers are heavy purchasers.

Fancy weaves are the favorites in dress goods, contrary to predictions, although plain designs are more extensively called for than for some time past. Camel's hair plaids, boucle, corded and rep effects in silk and wool mixtures, and coarse yarn weaves in broken plaids and multicolored styles, are particularly popular.

Wool Market.

Immense sales seem to be the order of the day, and they have continued for an unusually long period. Sales amounting to ten million pounds and over in the Boston market occasion no great surprise. Though a large portion of this movement is due to the purchases of manufacturers, it should not be forgotten that dealers have operated among themselves to a very large extent. The Australian wools seem to stand in special favor. It is impossible at this moment to tell what the statistical status of wool is among dealers and manufacturers. We are compelled to view the situation in the light that manufacturers and dealers are well supplied, at least, with the foreign article, and we are impelled to believe that manufacturers, too, are well supplied for a considerable number of months ahead. Whether they have a stock in hand that will last them from six to eight months more, will depend very much upon the extent that they operate their machinery to meet the improved demand for goods. Since the first of January, prices have advanced 45 to 50 per cent., and wools that could have been bought in the first week of January at 40 cents on the clean basis, are readily commanding 58 to 60 cents to-day. In fact, some of the Australian wools, capable of spinning to 80's, are bringing fully 60 cents clean, and 70's are close upon this figure. At any rate, nothing can be had of this description for less than 57 cents clean. Prices for the domestic article have reached for Ohio fleeces, XX and above, about the level that existed at this time in 1892, when the McKinley tariff was in operation. Ohio XX and above commands 26 cents per pound. Territory wools are in great demand, bringing as high as 45 cents, and, in some instances, 50 cents clean, per pound.

Cotton Market.

The price of middling uplands at present writing is 8 1-16 cents for spots. Crop advices are generally quite favorable. American and foreign spinners are limiting their takings to their immediate wants, evidently expecting a large crop and relatively low prices. The crop for 1896-97 has turned out to be about 8,500,000 bales. The exact statistics we have not yet received. The new year has opened with a small supply of cotton. Mills, in many instances, have been compelled to curtail production, or close down entirely, because of their inability to obtain desirable selections for their goods. Prices have been governed very largely during the past month by speculative manipulation. The recent rains, if followed by warm weather, will prove beneficial, rather than otherwise, to the growing crop. Since our writing a month ago, H. M. Neil has issued a circular which has had some effect upon trade operations. In that circular, he says that the promise is as favorable for a full crop as any previous year, in every State but Texas, and "on the present acreage, even allowing that Texas shall fall short of her maximum product per acre by one million bales, the outlook now is for a crop of at least 9 3-4 millions, with 500,000 to 1,000,000 more within the range of possibilities." Mr. Neil regards this figure of 9 3-4 millions as very conservative, "for a product per acre, outside of Texas, equal to 1894-95, would give 7,350,000 bales, and a maximum for Texas would be 3,950,000 bales, from which, allowing one million off, you would have a crop of 10,300,000 bales." It may be interesting to quote, in connection with Mr. Neil's remarks, what Ellison & Co. had to say in their circular of August 11th, which was issued two days prior to Mr. Neil's circular. Ellison & Co. said: "Even if the yield should reach ten million bales, it will come upon a market denuded of stock, and though prices would sink below their present level, the lowest figures touched would be considerably above the depressed rates witnessed in the 9,900,000-season of 1894-95." The size of the crop, of course, will largely depend upon the appearance of killing frosts in the growing States. Everything now depends very largely upon weather conditions that may prevail during the harvest period. On the whole, the month of August has been a propitious one for the crop, which, though late in starting, is in excellent condition. According to the returns to the Department of Agriculture, showing the condition of the crop up to August 1, the percentage was 86.9, against 80.1 at the same time last year. Decided improvements occurred, particularly in the South Atlantic States. The reports of shedding in some portions of the South are really of very little account, as the shedding is common, to some extent, even among the most healthy plants. It appears that the Texas Railway Commission's new tariff has gone into effect on all the railroads in the State. In spite of rumors that an injunction would be secured preventing the railroads from putting the tariff into effect, no such step has been taken, and the tariff was published by the roads with the usual protest and with the usual resolution of the right to contest its operations at any time. It is said that the roads are going to try the tariff for a month or two, and then go into the Federal Court with a positive showing of the damaging effect of the new rates on net revenues. The Galveston lines will be depended upon to take the initiative, as they are most interested.

—In an address to the London Chamber of Commerce, lately, the Japanese Minister said cotton spinning started in his country a little more than ten years ago, engaged 693,909 spindles last spring, and the number would soon be increased to a million. The production had hitherto been confined to coarse yarns, but the time would probably come when Japanese mills would turn out yarns of every description.

COTTON DEPARTMENT.

The Principles of Cotton Spinning.

ROBERT CUNLEFFE.

When we have got our stock of cotton complete, our next duty is to pass it through the machines, and spin it into yarn. Before doing this, however, there are one or two considerations which ought to engage our attention.

First, to make as much weight of yarn as possible from the weight of cotton we have got; and second, to obtain as far as possible the best results in the strength, cleanliness and general appearance of the yarn. In order to do this it will be necessary to understand to some extent, the material with which we have to deal. A fibre of cotton is a very delicate tube of pure cellulose of small diameter with thin cell walls, and very liable to rupture or breakage if subjected to harsh treatment. We may have some idea of the tenacity of the cotton fibre when we mention the fact that from 14,000 to 20,000 individual fibres of American cotton weighs only one grain; so that there are about 140,000,000 in every pound, and each fibre only weighs on an average about one seventeen-thousandth part of a grain and if the separate fibres were placed end to end in a straight line, one pound weight would reach 2200 miles. All cotton fibres irrespective of variety are not, as we would suppose from ordinary examination, solid threads, but are hollow cylinders, irregularly twisted throughout their length and tapering to a fine point. This natural twist varies in fibres of different varieties. The first species showing a greater amount and more uniformity of twist than the coarser varieties. This natural twist is of a great assistance to the spinning process, as, in fact, if it had not this characteristic, the ease with which the fibres are united would be greatly lessened, and the breaking strain of the yarn would be much lower. We may here mention that it is very important in purchasing cotton to be spun into yarn, to see that the cotton is fully ripe, inasmuch, as in unripe cotton this natural twist is absent, and the fibres of unripe cotton are shorter, weaker, and will not take the bleaching or dying process so readily as the ripe fibres do. Dr. F. H. Bowman, in his excellent book on "Cotton Fibre," tells us that with the machines used at the present time, and the way the machines are used, we only utilize about 20 per cent. of the strength of the cotton fibre. This statement is rather startling, and we may well inquire where is the 80 per cent. of loss of strength, and does this statement not also show us that there is yet a very great field for improvements in the machines used to-day for converting these fibres of cotton into yarn. But besides that of loss of strength, which is a very important question in itself, another almost equally important presents itself, and that is loss in waste. Now it must be admitted at the outset that we cannot make good, strong yarn without making a certain amount of waste. In the first place all cotton has a small percentage of short undeveloped fibres which, if allowed to go along with the rest, would tend to make the yarn weak and rough. Then again there is a small amount of waste made at each process which must be made to keep up the quality of the yarn. Such, for instance, as the dropping at the opener and scutcher, the strippings and fly at the card, and so on; but we think a much smaller percentage of waste might be made with a little care, and a greater percentage of yarn made without at all lowering the quality. It will be our object, in these articles on "Cotton Spinning,"

to keep this before us, to point out the machines and the best method of using, working, and setting them so as to produce the best results from the machines as at present constructed. Now the condition in which the cotton is received at most of the mills, especially those which are any great distance from the cotton fields, is in the worst possible condition for spinning into yarn. As every body knows, when the cotton is picked and ginned, it is put into bales and subjected to an enormous pressure in order to get a great quantity in a small space. This is done for the purpose of saving in the cost of shipment, the charge being based on the cubic feet of space taken up in the ship. When the bales are opened at the mill, the fibres are found to be matted together and the cotton is taken out in large, hard pressed lumps, far different to the loose and open condition it was in, when put into the bale. These hard-pressed lumps, and the various impurities, such as sand, broken seed, leaf, etc., which all cotton contains to a more or less extent, render it absolutely necessary that some sort of opening or loosening machine be used to restore it to its natural, open or fleecy condition. These machines will be referred to in our next article.

Leno Weaving, or Gauze.

Continuing the subject of my article in your issue of July, in which we were confined mostly to the different movements required in cross weaving, we will in this article take up the first of the three varieties of leno, the one that is known as the "half leno."

I must also state here, that there are very few leno cloths made but what have a combination of "half leno" and "full leno" weaves in their make up, and still, neither "Ashenhurst" nor "Posselt" in their books on designing treat with this "half leno" weave. This weave, as previously explained, is not a "gauge" for the reason that there are no perforations in the cloth. This weave is made by a two or more ply cord being passed by the doup harnesses from right to left of 1-2 or more crossing threads, and after 1-2 or more picks, that the making of this half leno weave is just the reverse to that of the full leno, and must be made by the following rule:

The harness carrying the doup thread must not be raised on the pick before nor after the crossing picks, or when the standard harness is raised. It will be readily understood that this cord passing alternately from side to side of the crossing threads only after 1-2 or more picks will form a wavy or zigzag line running down the cloth. These half leno weaves always being

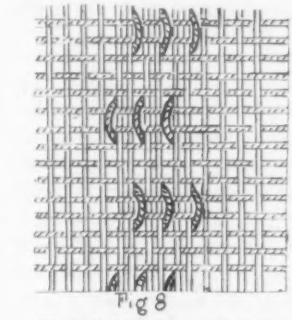


Fig 8

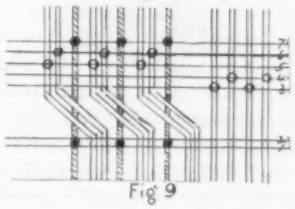


Fig 9

made with a two or more ply cord for the doup thread, the crossing threads should always be doubled, that is, run two ends as one, but if we have to weave them with single threads crossing, be sure to have them all down on the crossing picks, because one single thread would not be strong enough to hold the cord.

Fig. 8 illustrates one of these half leno weaves with three cords running side by side in a zigzag manner with two single threads crossing each cord. You will notice that on the two first picks, which are doup picks, the doup threads were held up on the right side of the two crossing threads which are down, then the doup threads remained down for three picks, while the cross-

ing threads wove plain, then the crossing threads were left down and the doup threads were raised by the standard harness to the left side of the crossing threads and held up for two crossing picks, and with three more picks of plain we get a repeat of the pattern.

Fig. 9 illustrates the drawing in draft for Fig. 8. No. 1 is the half harness; No. 2 is the standard; No. 3 and 4 are the plain and selvage harness; No. 5 and 6 are the two crossing; and No. 7, the doup thread harness.

Fig. 10 is the harness chain for Fig. 8. The 20th jack is always reserved for the slackner. You will notice that

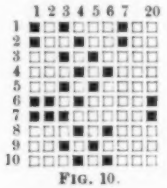


FIG. 10.

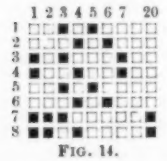


FIG. 14.

the 6th and 7th picks are crossing picks, so that on these two picks the slackner is raised. The cords for these half leno weaves are always run on a separate beam, and must be woven with a much looser tension than the bottom warp to allow the cords to lap over the crossing threads, and to form the proper angle. In drawing pattern Fig. 8, in the reed, the plain is drawn two in a dent, then one dent is left empty, and the next cord and two threads in one dent, then one empty dent, and the third cord and crossing threads in one dent, and repeat. These dents are left empty to allow the cords to spread.

Fig. 11 illustrates another half leno weave with two double ends crossing the doup threads. This weave forms what is called a diamond pattern, and is made by the reverse tieing of one of the doups, and reverse drawing of one of the cords, by what is known as a left hand doup. The two doups shown tied in at Fig. 3 (See Textile World for April) are right hand doups. All doups are tied in right hand except when tieing in for diamond patterns. I have made two drawings in drafts for Fig. 11 to show the reason why the cord on the right hand side should be drawn through a left hand doup. In drawing in these warps the girl always starts at the right hand side and draws toward the left, and when the cord, or doup threads, are drawn in before the crossing threads, we know that this cord, or doup thread, is to be passed through a right hand doup, and when the crossing threads are drawn first and the doup thread afterward, a left hand doup is to be used. As we examine the drawing draft at Fig. 12, we notice that the doup thread is drawn in to the right of the crossing threads, then this must be for a right hand doup, as shown at Fig. 3 in your issue of April. The next cord is drawn in to the left of the crossing threads, so must be for a left hand doup. Now when the doup thread harness and the doup, or half 1-1 harness is raised, the right hand doup will slip the heddle on the standard harness, and come up on the right hand side of the crossing threads as in Fig. 4 (see July number), so that the left hand doup must be tied in just the reverse to the right hand, so that it will slip its heddle and come up on the left side of the crossing thread.

As we further examine the draft at Fig. 12, notice that when the standard and half harness is raised, the two doup threads will come close together as on the 3rd and 4th picks, at Fig.11. These two picks are the crossing picks and on the 7th and 8th pick, which are the two doup picks, the cords spread out to form the diamond: this is just the reverse to what they ought to be, for we find in the majority of leno patterns, that there are always a less number of crossing picks than doup picks. On most leno patterns we find but one pick holding the cords when they spread out, and as the doups wear out more on the crossing picks

than on others, it will be best to draw the first cord in after the crossing thread, so that the two cords will be together as in drawing in draft shown at Fig. 13, and when they spread it will be on the crossing picks as shown at Fig. 11, picks 7th and 8th. The

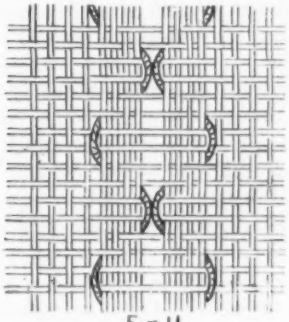


Fig 11

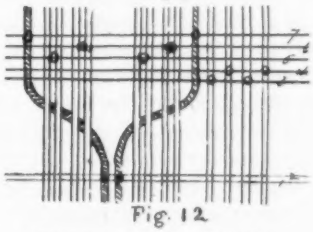


Fig. 12.

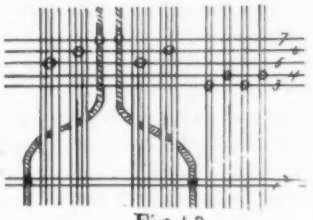


Fig. 13

chain draft for weave at Fig. 11 is shown at Fig. 14. This chain draft will do for both drawings in drafts Fig. 12 and 13. DOUP.

(To be continued.)

Shaping Cops.

The shape of cops is determined to some extent by the winding faller sector, shaft and wire; that is, providing the rail and plates are in a perfect condition. If the profile of the rail and plates, or the shape of the rail and plates be correct, and the cops are out of shape, then the faller sector is probably out of its correct position. What are the correct positions of the centres of these three pieces of mechanism? J. Mottram answers this in the Textile Recorder, Manchester, Eng., as follows: "During the operation of winding the yarn on to the spindle, the winding faller wire must pass an equal distance above and below a certain point, which should be the centre of that part of the spindle blade which is exposed above the bolster or top spindle rail, or that part of the spindle on which the cop is built. When the wire is in this position, the centre of the stud that connects the bootleg to the faller sector must be in a horizontal line with the centre of the winding faller shaft. The smallest distance of the winding faller wire from the spindle point during its passage should be from three-sixteenths to one-quarter inch, this forming the distance or clearance from that part of the spindle on which the cops are built, subject to the building of an extremely large cop, in which event the distance must be greater to clear the bottom cone. To make this alteration, the position of the winding faller shaft must be changed, so as to give a different radius of the winding faller wire behind the spindle. This radius is fixed by that of the centre of the wire at the point where it is attached to the faller finger placed next to the headstock, and must be equal throughout the length of the mule, a similar remark applying to the counter faller. To obtain this setting correctly, it will be necessary to periodically test the length of the wrought-iron sickles, from centre to centre, which should be equal to that of the cast-iron fingers next to the headstock and mule ends. The motion of the faller wire behind the spindles is a segment of a circle. When the faller wire is in the centre of the spindle blade, it is then at its furthest point from the spindles, and any motion either way brings it nearer to them.

"In order to ascertain whether the sector is out of position or not, the fol-

lowing course should be taken: If an examination of the cops being spun showed that their shape was not right—that is, that they increased in diameter, while the rail and plates were correct—it would lead to an examination of the centres of the sector stud, winding faller shaft and wire, which can be conducted in the following manner: After doffing a set of cops, and recommencing for another set, on the first stretch or draw, stop the carriage on its outward run, and take the sector stud, that is, the one which connects the sector and bootleg together, and replace it by one of the same dimensions, but having a projecting end of about six inches of the same diameter as the winding faller shaft. Now run the carriage out, stop it on its inward run, and by means of the shaper screw wind the faller wire up the spindle blade, until the winding faller wire is in the middle of that part of the spindle above the bolster. Having done this, the explanation shows what the correct positions of the three centres should be. To ascertain the accuracy of their positions, place a spirit level upon the winding faller shaft and the projecting part of the stud by which the sector stud has been replaced, and it can be seen at once whether one centre is higher or lower than the other. If the one is lower than the other, place a block of wood under the lowest end, so as to raise it, until the spirit level shows it to be true. By measuring the block of wood it can be seen how much too high or too low the sector stud is. After testing in this way, the next thing to do is to adjust the centres of the sector stud and winding faller shaft relatively to each other. As stated, the sector stud requires to be a quarter of an inch lower to be in its correct position, and there are two points in which it can be adjusted. In one case lower the anti-friction bowl (which the bootleg rests upon during the action of winding) in the slot in which it is placed in the trail lever, to the amount that the sector stud is too high, viz: a quarter of an inch. The other point or place of adjustment is at the point of attachment of the bottom portion of the bootleg, where there is a slot in the top portion, thus enabling the bootleg to be either lengthened or shortened. Raise the bottom part a quarter of an inch, there being an adjusting screw for the purpose. All makes of bootleg, however, are not provided with an adjustable portion, and with a bootleg of this description there is only one point at which it could be adjusted, viz: the anti-friction bowl. Wind the faller back to its correct initial position by the shaper screw, and then run the mule up, stopping it again during its outward run, because, lowering the bootleg either by the anti-friction bowl or by raising the bottom portion, involves winding higher up the spindles than was the case previous to the change. At this stage a very important matter has to be dealt with. This is the relation of the winding faller wire to the sector, which should be thoroughly understood before proceeding further. It is common to have the distance between the centres of the winding faller shaft and wire twice the distance as that between the centres of the sector stud and winding faller shaft. Suppose the distance between the centres of the sector stud and winding faller shaft to be 4 in., the centre of winding faller shaft would be 8 in. These conditions cause the winding faller wire to be raised half an inch higher up than the spindle, when it is at its lowest point for winding, by lowering the sector stud one-quarter of an inch. It is important, however, that the winding faller wire occupies the same position as previously, so that a further adjustment is necessary. First find out what the distance is from the winding faller wire to the spindle point during the outward run, which should be about 1 1-2 inch. Having altered it half an inch, it is in such a position that during the operation of winding it will wind about half an inch higher up the

spindle than it did previously to the change. The following is the best method of accomplishing this: Loosen all the winding faller sickles, and depress them half an inch towards the spindle points, and by this means the winding faller wire will travel to its former position in winding. After making this alteration, the distance of the winding faller wire from the spindle points is only 1 inch instead of 1 1-2 inch as previously. If it is left in this position, the operatives could not pick up the broken ends from the spindle points without continually touching the wire with their fingers. It is therefore necessary to adjust the wire so that it is again 1 1-2 inch from the spindle points. It is necessary to consider the construction of the mechanism which tends to hold the winding faller shaft in the correct position. The winding faller wire in its motion moves in a circle, and is prevented from making a complete revolution. The centre round which the faller moves is that of the winding faller shaft. Attached to this shaft are what are termed faller hammers, which are secured to the shaft by means of set screws. They have a projecting finger resting upon the counter faller shaft, and which prevents the winding faller shaft turning. To place the winding faller wire the same distance from the spindle points as it occupied previously to the adjustment, all the faller hammers but one must be loosened first, then this one also. The shaft can then be easily turned by pulling at one of the sickles until the faller wire is 1 1-2 inch from the spindle points. Secure the hammer named first, and then the remaining hammers, so as to prevent any further oscillation or turning of the winding faller shaft, and by so doing the winding faller wire will be in its correct position."

—The flag of any nation seen in foreign ports advertises that nation's products and its commercial standing in the eyes of foreign consumers.

Practical Cotton Designs.

Continued from August.

In working designs of the class referred to in my last article, where the figure is intended to be all weft, it is necessary to let the lines of the figure run as much as possible in an almost horizontal direction, as it is on this simple fact that the close imitation of the real lappet depends.

A cloth has just come to hand where the designer apparently has not taken this into consideration and where the lines of the lappet run in a vertical direction. Instead of showing up clearly and sharply, they have a very seedy appearance and the result is

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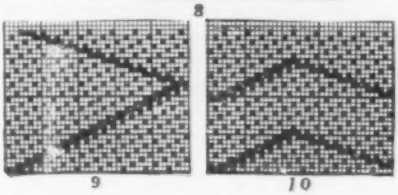


9 10

anything but pleasing. Manufacturers of figured zephyrs might also work the above style with advantage, as very pleasing effects in color would result if satisfactory shades were used.

For the benefit of this class of manufacturers, a floral design suitable for a zephyr is given at Fig. 8. It is sketched to be woven in a 400 jacquard with 96 ends per inch, and is complete on 200 ends, with picks, warp and weft as per requirements. The stems of the figure should be developed with warp, and the leaves and flowers with weft. The leaves should be bound with an 8-end satin and, in some instances, with twill to give contrast, whilst the flower should be sketched very loosely to give prom-

inence. If the above remarks are attended to, a bold but neat design will be the result.

There is always a cry for something new in satin brocades, and manufacturers of these goods are sometimes almost at their wits' ends to know how to please buyers, but it is not so much the elaborateness of designs that is wanted, as some novel feature in the ground of the fabric which does not injure the feel and texture of the cloth. For feel and texture, the ordinary five-end satin will always hold its own, and should be taken as a basis to work from, and in experimenting care should be taken to keep the texture to it as near as possible, as it is very little use in bringing out something new in satin brocades which has a harsh feel after being woven. Figs. 9 and 10 will illustrate what can be done without even departing from the principle of a satin binding. The effect when woven, would be a fine line of weft running in a zigzag manner up or across the piece, and although the line is extremely delicate it will show up very prominently owing to its agreeable relation to the wale of the satin. To make ground effects of the above description it is advisable to first fix on the number of ends and picks it is intended to make the ground complete on, which will of course have to be a multiple of five to come in with the satin. Then prick up the satin dots on the determined number and proceed to experiment. The floats of weft (which need not be more than four), must in all cases follow the binding of the satin, as it is by keeping to this rule that the texture and softness of an ordinary satin ground is maintained. MEDALIST.

—Fuller's earth looks like a clay when found, but it has very different qualities. When thrown into water it immediately absorbs it, but breaks down into a fine pulp without being pasty. It is moderately heavy, compact, but friable, and unctuous to the touch.

A Step In Advance In Weaving.

THE NORTHROP LOOM.

The introduction of the Northrop loom, built by the Draper Co., of Hopedale, Mass., into our cotton mills marks an era when a step in advance in the weaving of cotton goods took place. This loom, since its perfection, has met with much opposition, the same as all other new inventions, yet its progress has steadily gone on until the present time, when it has passed the experimental stage, and is pronounced a labor-saving machine by all who use it. The writer of this article, having no interest in or connection with the loom, recently made a visit to the Pacific mills, of Lawrence, for the express purpose of investigating the workings of the loom, so as to determine the value of its real worth from those having a good number of them in use. We find that the above mills have eight hundred and two of these looms in operation, weaving prints 64 square. These looms are running 185 picks per minute and producing 92 per cent. of the possible product of a loom being operated at this speed, and the goods woven by them, we are told by Mr. Sargent, the overseer of the weaving department, are, on account of the warp stop motion used on the loom, of a higher grade or more perfect than those woven on their other make of looms.

One weaver operates sixteen of these looms, and one loom fixer takes care of 110. The weaver receives in pay for weaving on these looms, as near as it can be figured, 62 per cent. of what they get per cut for the same goods woven on their other make of looms; and it might be well to state here that their other looms are all nearly new and in the best of order. In regard to the weavers being willing to work on these looms, Mr. Sargent states, on account of its being easier to run sixteen of the Northrop looms than it is to run the common number that a weaver runs of the other make, that is it considered desirable by them to get a chance to work on the Northrop loom.

We were assured by the management that the loom, in their opinion, was certainly an improvement over the common one, and that as fast as they made any changes in their weaving department, in the way of putting in new looms, they should certainly put in the Northrop loom, as it reduced the cost in the weaving where these looms were in use. Such testimony as this is beyond rebuttal, and there can be no question that a mill which is fitted up with these looms can produce goods cheaper than one using the old style of loom. All of our prominent loom builders have a license to build these looms, so that they can be secured from a number of shops. For a manufacturer to feel any uneasiness in adopting this loom in his mill is skepticism of the worst form. There are in use in our cotton mills at the present time over twenty thousand of these looms, which are, as far as we can learn, giving the results anticipated by their purchasers, and it seems the time has come when the use of this loom means a great saving in the most expensive department of a mill.—[Communicated.

Printing of Metallic Powders on Calico.

S. BRADBURY, England.

II.

By means of semi-liquid compositions made in the manner described in my previous article, in your August issue, there can, with the aid of printing stencils, be produced on any desired textile or other fabrics, designs that will withstand boiling, rubbing, washing, and ironing, and which will not turn black or change color under atmospheric action. Printing compositions, according to this invention, possess also the advantage that when they are used in the printing machines they lubricate the stencil plate as the same passes under the fixed presser during the printing of the fabric.

There are also upon the market bronze colors ready prepared for printing, i. e., with the varnish and the powder already mixed together. These are, however, expensive; and it is certainly preferable that the colorist, having found out the composition which gives him the best printing results, should add the bronze to it only as he requires it for use.

Of the various printing mediums already mentioned in detail, the india rubber solution (e) and a good, specially made varnish (g) give, so far as my own observations go, the best results. The color with each is quite fast to washing or rubbing or any other process through which the printed fabric is put during subsequent operations. In the actual printing there is nothing to choose betwixt them, but the varnish medium, if the right one be obtained, is the more economical. One such varnish now being sent out to calico printers is but two-thirds the cost of the india rubber solution.

In all cases as detailed above (except where the printing color is obtained ready-mixed) the powder is added to the paste at the rate of from 2½ to 4 lbs. per gallon, according to the quality of the bronze powder being used,—and of these powders, according to fineness and composition, there is considerable difference in price and quality—with careful mixing. Should the color stand for awhile after mixing, it must again be stirred before use. No special preparation of the cloth is necessary before printing, though the goods are better for being first calendered. In the printing itself, the chief difficulty is in the settling of the metallic powder in the engraving. To avoid as much of this as is possible, a brush, to which a slight traverse motion is given by means of a cam at the end, is used to furnish the color to the printing roller. A cloth, kept damp with turpentine or naptha, according to the thickening in use, must also be constantly applied to the roller, where possible, by means of the lint doctor or otherwise. Where special patterns are engraved for bronze printing, care should be taken that the engraving is a little deeper than for ordinary work. Where this

is done, the precautions above mentioned taken, and a good varnish and bronze-powder used, effects fully equal to those got by the stencil process of printing can be obtained.

After printing, but little treatment of the cloth is necessary. Where the bronze is only in the character of a cover, over a previously dyed or printed ground, run over the cylinders as usual, and then hang the goods for 24 hours at least. In works unprovided with a hanging-room, the bronze-printed goods may be wound on as if for steaming, and then suspended for the same length of time upon poles. Afterwards the goods are calendered, then run through water, nipped, dried, and finished as may be required.

Should steam colors be printed along with the bronze, the goods are steamed after hanging, and then follow the usual course. If the cloth after printing is for crimping, the pieces are hung, then run through caustic at 70° Tw. (or preferably nipped only through the caustic), washed in the spiral state over the fly-wince or in the ordinary rope washing machine as may be most convenient, hydro-extracted, and dried. For crimping purposes, compositions "e" and "g" both give quite satisfactory results. The thickening acts as a perfect reserve against the caustic in either case; and the bronze powder is quite fast to whatever washing, etc. is afterwards necessary. Care must be taken in printing colored bronzes for crimping, that the colors so used are such as are not decolorized or distroyed by the caustic.

One other method of printing bronzes which has lately been tried, and has given good results, partakes in character of both the old and newer methods. It is especially applicable where several different bronzes are to be printed together, i. e., each of several rollers with a different bronze color.

In this case an extra roller, engraved so that upon its impression that of each of the others shall afterwards fall, is obtained. This roller is worked first, furnished with a paste as follows:—

3 parts dextrine, 8 lbs. to gallon.
3 parts egg-albumen, 6 lbs. to gallon.
1 part varnish (N) below.

VARNISH N.

A.

8 lb. copal; fuse; add
2½ galls. clarified oil; boil till very stringy; add
¼ lb. dried copperas;
¼ lb. litharge;
5½ galls. turpentine; boil, then strain.

B.

8 lbs. gum anime,
2½ galls. clarified oil,
¼ lb. dried sugar of lead,
¼ lb. litharge, boil, add
5½ galls. turpentine.

Mix (A) and (B) together while hot.

The color for the rollers which follow is

1 gal. copal varnish (see receipt under heading "e"),
3 to 6 lbs. bronze powder, according to the quality of the powder and the amount of nip to come upon the corresponding roller.

After printing, dry, hang, etc. as before.

A word in conclusion as to the metallic powders used. Those which are now being printed are generally either aluminium, or mixtures in certain proportions of zinc, tin and copper. Where bright-colored bronzes are required, the metallic powder is colored with a basic dye dissolved in methylated spirits. It scarcely need be said that the finer the powder the better and sounder the print. For this reason, and although more expensive, aluminium, whether used pure to give a silver effect, or colored to any particular shade required, yields by far the most satisfactory results.

—There are thousands of foreign workmen in the United States to-day who made good wages before they came here, and who decided to try the United States because it appeared to them there were larger opportunities than existed in their home-land.

WOOLEN DEPARTMENT.

Mathematics in Textile Work.

BY THOMAS R. ASHENHURST.

(Continued from August.)

Now comes the critical question. What is the density of the average thread? It has been laid down that the specific gravity of vegetable fibres is 1.5, and of animal fibres 1.3. Then it is necessary to find the diameter of a thread in a state of absolute density, as though it were a solid substance as iron or steel or anything else. Then working on the basis of a cubic foot of pure water at a temperature of 60° weighing 1000 ounces avoirdupois, the number of cubic inches of water in one pound would be 27.64, and the specific gravity of fibres being 1.5, then $27.64 \div 1.5 = 18.42$ cubic inches of solid matter in one pound. It is necessary now to find the sectional area of a thread of a given length formed from this bulk, and then reduce it to a convenient unit of measurement, so as to form a definite standard of comparison. Seeing that in cotton there are 840 yards per hank, and the number of hanks in one pound represents the counts, it will be convenient to work on the basis of 1's cotton or 840 yards per pound, and reduce the unit of measurement to one inch and find the sectional area of this thread. Then as there are 18.42 cubic inches in one pound, and 840×36 inches in one hank

$$\frac{18.42}{840 \times 36} = \frac{18.42}{30240} = .0006,$$

the sectional area of a thread in the form of a solid compact body. As threads are of cylindrical form, it is necessary, therefore, to reduce this sectional area to the sectional area of a cylinder, and find the diameter of that cylinder. For this the rule is to divide by .7854 in the first place and then extract the square root to find the diameter, thus:

$$\frac{.0006}{.7854} = .00763$$

the sectional area of the cylinder, and $\sqrt{.00763} = .087$, and $.087 = \frac{87}{1000} = 11.5$, or $\frac{1}{11.5}$ the diameter of this solid thread, or in other words 11 1-2 of those solid threads would lie side by side on one inch. This furnishes a reliable data for ascertaining the state of density of threads assuming their diameters to be on the basis just previously laid down, or it may be made the basis for determining the diameter of threads in any given state of density as they may be required for some specific purpose. Now work the operation backwards, that is, find the diameter of the threads either from the published tables, or on the basis of the square root of yards per pound; thus: $\sqrt{840} = \frac{1}{29}$ and $\frac{1}{20} - 10\% = \frac{1}{26}$, and $\frac{1}{26} = .0384$. Then $.0384^2 = .00157456$, and $.00157456 \times .7854 = .001236659424$; and $.001236659424 \times (840 \times 36) = 37.39658$, and

$$\frac{27.64}{37.39658} = .739,$$

or in round numbers equal to half the specific gravity of the fibres of which the thread is composed, thus ensuring a sufficient degree of flexibility in any cloth made from threads of this density. Then this may be taken as a fairly reliable basis to start from in applying mathematics to the building of cloth on true scientific principles.

Having found the actual diameters of threads, it is as easy to proceed to determine the number of threads per inch to produce a perfect fabric as it is for a builder to ascertain the number of bricks to build a wall of given length, height and thickness. It must be understood, in the first place, that every

fabric is not a perfectly typical structure, and in the second place that perfect structure is dependent upon pattern as well as the actual bulk of the threads of which the fabric is composed. The manner in which the warp and weft threads intesect each other, and the relative bulk of the two sets of threads, both have their influence upon the structure and the determination of the number of threads per inch which the cloth should contain.

Without, at present, going into all the questions raised in any works on "Textile Calculations" and "Design in Fabrics," the first principles of building a plain cloth may be dealt with for the purpose of showing their application. Take, for example, a plain calico, and suppose the warp and weft to be equal in every respect, I merely give this as a supposition, for, as a rule, the weft will be slightly thicker than the warp, then, the two sets of threads intersecting alternately, it would appear that the spaces between the threads should be equal to their diameters. This would be perfectly true if the threads by their pressure upon each other did not cause a certain amount of bending to take place in both warp and weft; but seeing that this bending does take place in one or both materials it must be taken into consideration, and the space between the warp threads reduced proportionately. It also raises the interesting question of how much bending, or what angle of curvature should the threads form to obtain the best results? It is obvious that the angle may be made to vary according to the number of threads of a given bulk in a cloth. For the purpose of laying the general principles down clearly, this question of bending may be left aside for a moment, and simply build a cloth on the assumption that the space between the warp threads is equal to the diameter of the weft thread. Then say the warp is 20's cotton, or 30's worsted, and $\sqrt{20\times840}=\frac{1}{130}$, nearly, or 130 threads would lie side by side in one inch. Then if every alternate thread be removed to make room for the weft to intersect with the warp there would be $\frac{130}{2}=65$ ends per inch in the fabric. It must be clearly understood that this is the maximum number of threads that a cloth may contain and retain any reasonable degree of flexibility. It now remains to find the minimum for a cloth without reducing it to an absolute rag, then it will be easy to find that happy medium which will ensure a perfectly sound cloth which will present the best possible appearance. The great importance of this can be readily understood when it is pointed out that the manufacturer knows to what extreme he can go in lightness or heavy weight and retain soundness, or what medium he can strike to suit the winter or summer season, or the price at which he can sell his goods.

Before going into the calculations involved in finding the minimum, or the angle of curvature, it may be as well to make the foregoing as clear as possible by taking yarns of different numbers and showing fully how the matter is worked out, as the more clearly this preliminary process is understood the easier the subsequent ones will appear. Suppose then, that the warp is to be 2/80's cotton, and the weft 28's worsted. Then the diameter of each must be found thus: 2/85 cotton equals 40 hanks per pound; then $\sqrt{40\times840}=\frac{1}{183}$, as the diameter of the warp thread; and the $\sqrt{28\times560}=\frac{1}{125}$, as the diameter of the weft. And working on the maximum basis, as just laid down, $\frac{1}{183}+\frac{1}{125}=\frac{308}{22875}=\frac{1}{74}$. Or there would be 74 warp threads per inch and 74 intersections of the weft with those warp threads.

Any practical manufacturer of dress goods into which these two materials enter, would say at once that these would be too many ends per inch; that he would not expect the brightness of the worsted to have an opportunity of asserting itself. Therefore it must be

reduced. Let me say again that this should be the maximum number per inch for any material.

Then now, to find the minimum: Without detailing all the experiments I have made, and extending over a number of years, with, probably, some hundreds of fabrics, I have found that with the best cloths in the market, not necessarily the highest priced goods, but the most popular, and those declared by merchants to be the best value for the money, the angle of curvature in the weft, or in both warp and weft, whether in plain, woven or twilled goods, is one of 60°.

It is not necessary to discuss any scientific reason for this: I will be content to merely state it as a fact. If this angle of curvature is one of 60°, the simplest mode of procedure to find the number of threads per inch, is to base the number of threads per inch on the supposition that the distance from the centre of one thread to the centre of the next is equal to the base of a triangle having angles of 30°, 60° and 90° respectively; and since that triangle will be equal to one-half an equilateral triangle, that is, the hypothenuse will be just double the altitude, the length of the base will be found by dividing the altitude by $\sqrt{3}$. Consequently, by simply adding the diameters of the warp and weft together and dividing by $\sqrt{3}$, which is 1.732, the minimum number of threads per inch will be found. Taking the example of 2/80's cotton and 28's worsted, which gives 74 ends per inch, then:

$$\frac{74}{1.732}=\frac{74000}{1732}=43 \text{ nearly,}$$

or 43 ends per inch as the minimum.

There is a wide difference between 74 and 43, but I give them as the two extremes. In these calculations the threads are treated as lines having length without breadth or thickness, so far as the triangle is concerned, and without regard to their relative bending powers upon each other. But they possess both these, and for a strictly scientific cloth to be built, both would have to be taken into account, but sufficient accuracy for all practical purposes can be obtained without this. Any cloth built within 10 per cent. of the two extremes found in this manner, will be a sound fabric, that is, 10 per cent. above the minimum or 10 per cent. below the maximum, but the nearest approach to perfection, by an off-hand rule, will be by taking a true mean between the two, as

$$\frac{74+43}{2}=58\tfrac{1}{2}.$$

Any manufacturer can prove this by testing some of his best known cloths by the rules laid down.

As I have said, this rule is not scientifically true, because of the relative bending powers and diameters not being taken into account in finding the true hypothenuse of the triangles; but the margin of error will seldom exceed from 1 to 2½ per cent., so that it is sufficiently sound to work upon, and few faulty cloths will be made when this basis is adopted.

With this plain cloth as a basis, the number of ends per inch may easily be found for any other pattern. Thus, if a common twill, weft passing over two and under two ends alternately, there would be two intersections and two threads to complete the pattern, or more correctly two triangles found by this rule plus the diameter of two warp threads, as representing the space occupied by our pattern.

Suppose the warp to be 2/40's worsted and the weft 18's worsted, then: $2/40=20$ and $\sqrt{20\times 840}=\frac{1}{105}$, and $\sqrt{18\times 560}=\frac{1}{100}$ and $\frac{1}{105}+\frac{1}{100}=\frac{205}{10500}=\frac{1}{50}$ approximately, or 50 triangles per inch. But as there are two triangles and two threads in one pattern, it will be $(\frac{1}{50}\times 2)+(\frac{1}{105}\times 2)=\frac{10}{172}$, and as there are four threads in the pattern, $17.2\times 4=68.8$ ends per inch required, and so for any other pattern.

There are, of course, conditions dependent upon the relative diameters of the threads, the character of the pat-

tern, the question as to whether warp or weft should predominate, and others which would affect the working of these rules, but the general principle must hold good throughout.

Although I have only taken a brief glance at the subject, I trust I have shown that mathematics play an important part in textile work.

Spinning Mohair.

(Continued from July.)

In taking the slivers as they come from the gill box immediately following the combing, they are either in balls or cans. In drawing, a set generally consists of one can gill and one two-spindle gill. The slivers are weighed off the first gill and passed through the second, in sets of certain weights, and in this box, twist is put into the sliver. To get the length of sliver run into a can, or length wound onto a bobbin, the calculation is as follows:

Diameter of front roller, 2 1-2 inches; stud wheel, 60 teeth; change wheel, 34, gauge point, 11.4.

$$\frac{2\frac{1}{2}\times 60\times 34}{11.4}=447.3 \text{ yards.}$$

The bobbins of this last box are weighed in sets and passed through a four spindle box, five ends up, and drawn out to about one-eighth the weight put up for each end; six of these ends are then put up through the second drawing box and repeated on the weigh box, to be again weighed in sets and passed through the finishers. Suppose it is required to know the number of yards on a bobbin from the weigh box.

Diameter of front roller, 5 inches; wheel on small shaft, 17; stud wheel, 60 and 60; gauge point, 11.4; change wheel, 20.

$$\frac{5\times 17\times 60\times 60}{11.4\times 20}=1342 \text{ yards.}$$

In getting the twist for these boxes, it is better to be guided by the feel. The slubbing should stretch easily. If too hard or too soft, the twist can be regulated by changing the wheels on the lower back shafts, or those on the twist pulley. Up to this point, weighing and making up of sets have taken place, weighed and paired to make them as nearly alike as possible. It is requisite to keep some degree of evenness and regularity in passing through the drawing operations. If properly done it will avoid irregular slubbing, and be a step towards making a good level yarn.

The last operation in the drawing is the roving, and is mostly run with two ends up. Two finishing bobbins are put up at each end of the roving box and drafted to the desired weight. The twist of the roving depends largely upon whether the yarn is going to be used right off or kept in stock. If spun new more twist will be required. Mohair, alpaca, camels' hair and all long wools will spin much better if the rovings be laid aside for a time, as this allows the fibres to become set, and yarns from such do not have that wild appearance as those made from newly made rovings. Suppose a roving is wanted that will give 40's yarn when spun. This would require each 40 yards of roving to weigh 5 drams, with a draft of 11 to spin a good yarn. Lower counts require longer drafts. The flyer frame is used chiefly for spinning the above yarns. For short low stock, where roughness of fibre is not so much of an objection, the cop frame is very useful. While the operations are similar in practice as for worsted yarns, the drafts are longer, with ratches further back and carriers as open as possible to allow ease and freedom in working. If the machinery is run too fast, observation will detect a wiry and irregular appearance in the finished yarn. We used to run our flyer frames at about 2600 revolutions per minute. The following are dimensions for draft of flyer spinning frame:

Diameter of back roller, 1 1-4 in.; diameter of front roller, 4 in.; back roller wheel, 155 teeth; outside stud, 83; inside stud, 100.

$$\frac{4\times100\times155}{1\frac{1}{4}\times83}=596$$

gauge point for getting change draft wheel.

If spinning 40's with a draft of 11, this divided into 596 gives 54 change wheel required.

Dimensions for twist: Diameter of spindle whirl, 1 1-4 in.; diameter of cylinder, 10 in.; wheel on cylinder end shaft, 27; stud wheel, 85; front roller wheel, 215; circumference of front roller, 12 1-2 in.

$$\frac{10\times85\times215}{1\frac{1}{4}\times27\times12\frac{1}{2}}=430 \text{ G. N. for twist.}$$

If spinning 40's yarn, with 27 change wheel on twist, required the turns per inch put in; then $430\div27=16$ turns. Now, for a week of 60 hours, allowing 5 per cent. for doffing, waste, etc., the production of mohair yarns would be a trifle over 10 1-2 ounces per spindle. Now, taking the same counts in fine Botany worsted yarns spun on cop frames, the production per spindle would be about 2 pounds, 6 ounces. So it will be seen the production of mohair yarns is only one-third that of worsted yarns. But if the processes are properly managed the profits are larger. It is better to have large pulleys on the driving end, as this will prevent much slipping of the belts. Irregularity in twist is often caused by the slipping of belts and spindle bands. All slack bands must be kept off, as yarns with uneven twist makes weak and uneven cloth. Another important item that an overseer of flyer spinning has to attend to, is the irregularity of the drag. Atmospheric changes are the greatest drawback to this class of spinning. The temperature of the rooms must be kept at an even rate as much as possible; the same to be fixed by close study and observation, according to the locality and surroundings.

THE OLD MAN.

--About the beginning of Queen Victoria's reign there was no more prosperous trade in Lancashire than that of the calico printer.

Textile Ornamentation.

FENWICK UMPLEBY.
Head Master Designing and Weaving Departments, Lowell Textile School.

CHAPTER II.

Mr. Pariset, the famous author of the "History of Silk," tells us that the Chinese emperors reserved silk for the magnates of the empire. We know they were very careful to keep the manufacture of it to themselves. Not only did the Emperors manage the manipulation of this precious thread, but they had it manufactured under the roofs of their palaces. We have it from the very best authorities that, when the Celestial empire was split up into so many feudal states, all the courts of the empire vied with each other which could have the most magnificent and most gorgeous costumes, and each state engaged and employed the best workmen and the most skillful artisans to be found, such as thoroughly understood the working of silk. The Chinese people are quite devoted to their precious thread. When the Emperor Chun was traversing his extensive dominions, and had arrived at the foot of Mount Tai, he received the homage of his vassals, who presented to him such articles as were most likely to please him, including silk and woolen fabrics, raw silk and fabrics of many colors. The Emperor Le Wang, wore robes of extreme splendor made from silk and gold brocade. This Emperor was an enthusiast on the subject, having silk manufactured in his own palace. The Chinese had, nevertheless, worn this costly thread some three hundred years before the Empress Si Ling Shi discovered how to give it its full lustre and brilliancy. It is very astonishing that we have no record of any silk having been found among the ruins, or in the tombs of ancient Egypt. The absence of this fabric leads to the belief that the silk mentioned in the books of Genesis, Proverbs and Ezekiel, must have been a material derived from some worm, other than the true Chinese silk worm.

The anecdotes relating how silk first

found its way out of China, and ceased to be the monopoly of its very careful protectors, are not only curious, but of a most interesting character, showing how diligently the liberator of this sacred material must have planned and studied to free from bondage an article which was welcomed by all the nations of the globe, and which had been watched and guarded with all the care of its zealous country.

According to a Chinese legend a certain king of Khotan obtained the Emperor of China's daughter in marriage. When the Chinese princess was departing from her native country for her new home, she was much tempted to take some of the costly material with her; but how was she to take unperceived, this much valued substance, to which her native country owed so much of its wealth, its magnificent and glittering costumes? Like all others of her sex, she was full of contrivance and deep thought, and at last she hit upon the device to take the germ of this precious little worm from its native home. It occurred to her to conceal these small particles in her head dress—for who would dare lay rude hands on her fair locks? Procopius tells us that it was not till about the middle of the sixth century that the true silk worm eggs were found within the walls of Byzantium. Some Greek monks lived a long time among the Chinese evangelizing certain Indian regions. During the time, they learned the whole process of breeding, rearing and hatching the eggs of the silk worm, and no doubt gained some knowledge of the manufacture of the thread into a fabric. When these devout men returned to their own country, they, also, were unable to resist the allurement of this precious article, and they contrived to have secretly and skillfully concealed in their walking sticks or bamboo canes a quantity of the eggs of the insect. When they arrived at home, they made it their duty to explain to Justinian the real value and use of their secret treasure, and for their endeavors and the attainment of their efforts, Justinian rewarded them very handsomely.

The products of these eggs having thus found their way beyond the frontiers of China, were very quickly distributed over Asia Minor and Greece, and it was not long before the secret penetrated Persia and then found its way into Italy, and later into the west of Europe; and it was thus that a valuable commodity, which had so long been the exclusive monopoly of China, became the source of gain to other enterprising nations. The Grecians and Romans were at periods given to great excesses and extravagance in their costumes and modes of decoration and ornamention. They wore robes of brilliant colors and garments of extremely skillful workmanship. Plutarch tells us of Demetrius, surnamed Poliocertes, a man of great munificence and of wonderful power. At the age of twenty-two, he commanded an army in Syria, but he was vain and pompous and loved to display grandeur in his apparel. He is said to have been more like a theatrical player than a king, for he not only affected a superfluity of ornamentation, wearing a double diadem and a robe of purple interwoven with gold, but he had shoes made of cloth of gold with soles of fine purple, and he had engaged for his benefit artistes in the ornamention of textiles; for we read he had a robe that occupied a very long time in weaving, of the most sumptuous magnificence, both in color and design. The figures of the world and all their heavenly bodies were represented upon it. So gorgeous was this robe that none of his successors would ever presume to wear it.

Again, we read that when Alexander the Great had made himself master of Susa, he searched the king's palace, and found, amongst other riches, furniture of exquisite design, and of inexpressible value. There was purple of Hermione, worth five thousand talents, which, though it had been laid up a hundred and ninety years, still retained its first freshness and beauty. The total worth of this purple amounted to the immense sum of nine hundred and sixty-eight thousand, seven hundred and fifty

pounds (£968,750). A talent is worth in English money, one hunderd and ninety-three pounds and fifteen shillings (£193, 15 s.). This purple of Hermione is not only very difficult to obtain, but very costly in its production. Pliny tells us that a pound of double-dipped or twice-dyed purple, in the time of Augustus, was sold for a hundred crowns. The reason that is assigned for this beautiful color retaining its permanency, brilliancy and lustre, is that the purple wool was combed with honey, and the white wool with white oil. This fosters the idea that the material was dyed in its raw state, or as we commonly term it, "wool dyed," and we are assured that specimens of the same kind and age are still to be seen in all their freshness and lustre. Purple was, with the ancients, considered a color of great dignity, and was, therefore, much prized by the Greeks and Romans; it was regared by them as a preroga tive of sovereign power. Plutarch says, Galba was the richest of private men, but of a very parsimonious character; his pride was not in dress and gorgeous costume, but in strict economy and temperance. Galba was requested by Venius to put on the robe of dignity, and accept the imperial purple.

Whatever were the methods adopted in dyeing by the various nations in olden times, we must necessarily acknowledge that the ornamention and embellishment of textile fabrics have advanced step by step, the embroideries on the one hand, and the dyes on the other; and by combining these two, the ancients have contributed, in no small degree, to art in the adornment of textiles. Amongst the Romans there was an indispensible custom of carrying the spindle and distaff before a bride when going to the nuptial ceremony, and the Roman housewives and matrons are said to have made garments, not only for their own use, but also for the wear and adornment of their husbands and sons. Augustus, we are told, usually wore robes of exquisite design, made by his wife, sister and daughter. Still we cannot say that the Romans were born artistes; in fact, before their intercourse with artistic nations, they knew nothing of the art; they were a people much given to pleasure and sport, and the higher grades of society took more delight in the amphitheatre, witnessing a bull fight and in the performances of the circus, than in the cultivation of any works of art. The fine arts were introduced into Rome by Marcellus, who prided himself on being the first who taught the Romans to admire these works. It was in his time that they began to devote a part of their time to disputing about arts and artistes, thus gaining culture, advancement and refinement from the nations with whom they came in contact. Accordingly, they adopted the arts and fashions of the people who were overcome by them, and we have no reason to doubt that they learnt the practical part of manufacturing textile goods from those whom they oppressed, and it was thus that an art, which had flourished with the Greeks, Egyptians, Persians and Chinese from the earliest times, began now to develop itself in Rome; and from this time, the people spared no pains to equal, if not really to outstrip, their instructors, till they are said to have excelled in certain kinds of embroidery and needlework. To them the credit is given of inventing true lace work, called the "Scututata vestris," which was worn by persons of good position. This lace was worked on the garments with the needle. They adopted silk as a dress material about the first century before our era, and it became so common that it was worn by men and women, and by all classes of society. It was manufactured into so very fine and transparent fabric that it was very objectionable as a covering, and Elagobalus is said to have been the first emperor who wore these silken garments. We have no very encouraging accounts of ornamention in wearing apparel during his time. Tibullus speaks of this gossamer substance, and describes it as "lighter than the wind and clearer than glass." Seneca condemns this flimsy fabric, which he says is a protection neither for the body nor for

shame. So unbecoming was this gossamer attire in the commencement of the new era, that by a decree of the Roman Senate (Tiberias A. D., 16) men were forbidden to wear and disgrace themselves with silken attire. We read in the history of nations of the people ornamenting their dress or their bodies. Therefore we are justified in saying nothing new has been invented; we have but re-discovered and possibly improved upon the means employed by our forefathers, as we shall try to illustrate in following chapters.

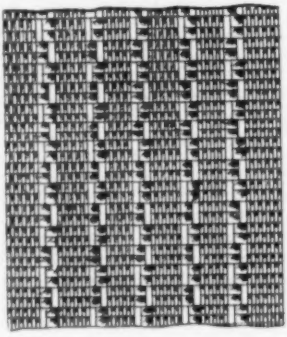
Degreasing and Cleansing Wool.

A degreasing and cleansing apparatus for wool, cotton-waste, etc., has recently been invented by an Englishman residing at Nottingham, the object of which is to effect the purposes of the machine in a more economical and efficient manner than heretofore, with solvents such as petroleum spirit or bisulphide of carbon in tanks arranged in vapor-tight apparatus provided with air-locks at its entrance and exit.

An essential feature of this invention consists in introducing the material to be treated into the apparatus in a continuous or practically continuous layer wound between the convolutions of a canvas or other band arranged in a specially-constructed winder or winding apparatus, whereby a sufficiently large quantity of material can be introduced at a time into the entrance air-lock to keep the apparatus supplied for a considerable period. A further essential feature consists in means for subjecting the material to a beating or stamping operation while in the solvent, to facilitate the degreasing and cleansing, it having been ascertained from experiment that this can be effected, even in the case of wool, without fear of such wool becoming felted or having its quality impaired. To further diminish the risk of injury to the material, there are provided beaters or stamps with specially-constructed adjustable heads having cushioning-springs to deaden the force of impact.

A New Design.

There has recently been invented a design or pattern, for a fabric like the accompanying illustration, by an Englishman. The design consists in broad stripes alternating with narrow stripes, the broad stripes having a plain figure of weft and warp threads of different color, and the narrow stripes presenting a zigzag appearance and being made up of the warp



and weft threads disposed so that the warps at one edge of the narrow stripes will go under one pair of wefts and then over the next pair of wefts, while the warps at the opposite edge of the narrow stripes will go over the warps first mentioned and under the next pair of warps, thus exposing the warp-threads alternately and in zigzag relation.

Navaho Weavers.

The Navahoes excel all other Indians within the borders of the United States, in the art of weaving. In durability, fineness of finish, beauty of design, and variety of patterns, the Navaho blanket has no equal among the works of our aborigines. Some thirteen years ago Major Matthews wrote a treatise on "Navaho Weavers," but he tells us that, since that book was written, the art has improved in one respect. A way has been devised of weaving blankets with different designs on opposite sides. In another respect it has deteriorated; fugitive aniline dyes, purchased from the traders, have taken the place of the permanent native dyes formerly used.

In the finer blankets, yarn obtained from white traders has supplanted the yarn laboriously twilled on the old distaff. The Navahoes weave diagonal cloth and diamond-shaped diagonals, to do which a change is made in the mechanism of their simple looms. They weave belts or sashes, garters, and saddle-girths, which articles also require changes in the arrangement of the looms and in the methods of weaving. It is not only for gain that the Navaho women weaves her blanket. Having worn it for a time, until it has lost its novelty, she may sell it for a price that scarcely pays her for the yarn. One who possesses large herds and is rich for an Indian, will weave as assiduously as her poorest neighbor. The work is done, to no small extent, for pastime.

—There is opportunity for a very large increase in the volume of our South American trade. Above all things else we need to give more careful study to the requirements of the South American markets. We need to familiarize ourselves with the classes of goods that are salable there, and the manner in which the trade is handled. We need to examine closely into the methods of our successful competitors, and to adapt to our own use all we find that is of service. All this must be done through personal contact with the merchants of South America. We must send there competent salesmen, who are able to speak Spanish or Portugese, and who are able to accomodate themselves to the conditions they find. We are lacking in transportation facilities, and in banking institutions which can do business direct with South America, but most of all we are lacking in personal practical effort to cultivate the trade of those countries.—[T. C. Search, president Nat. Asso. of Mfrs.

—The arid region of interior New South Wales may become, in time, the garden spot of that colony. The sheep ranges of the colony are principally located in that section. There is a sufficient annual rainfall in the interior to warrant a good supply of water, but it is so thoroughly absorbed in the ground that it is of no value, except as it may be brought to the surface by means of artesian wells. The sinking of the latter is now progressing, with fair prospect of their becoming sufficiently numerous to be used for irrigation purposes, and bringing up the fertility of the soil. Our recent Australian advices state that several artesian bores have been sunk some thousands of feet, giving an abundant yield of water of good quality.

—A new use or application of the telephone has been instituted in New South Wales, by which one of the wires of the wire fencing that surrounds the stock stations in the interior is utilized the same as the ordinary telephone wire in this country, the principal difference being that it is without insulation. The object is that quick communication may be had with distant stations, and even with the market towns on the coast. The fact that wire fencing can be turned to such an account is certainly an interesting innovation. There is some inconvenience in the non-insulation of the wire, as communications are impeded by damp weather.

—The decline in prices does not cover the changes brought about by the trying experiences of the past four years. Methods of business have, to a large extent, been revised. Prior to 1893, buyers were in the habit of purchasing largely in advance of their requirements, and manufacturers were thus kept well supplied with orders much ahead of the consumptive period. Buyers are now working very much closer to their needs, and the change tends in the direction of greater stability all around.

—In the year 1787, a Southdown ram brought, for the first time, as much as ten guineas.

KNITTING DEPARTMENT.

The Knitting Situation.

The opening of samples for spring business has become quite general, but the question of price is still an unsettled one. The prospects are quite favorable, but at present writing it is found difficult to materially raise the price of goods, due largely to the strong competition that exists. Prices, however, will have to advance, if manufacturers expect to get out whole, as they cannot make goods at former prices with wool over 30 per cent. higher than it was eight months ago, and cotton no lower. The price of the latter staple, however, is problematical, and more likely to recede than to advance, especially if the predictions of a large supply prove true. There is no good reason why knitting mills should not receive all of the benefits of the present prosperous condition of the market, as any other line of the textile industry. The mills that are operating on woolen goods are reported to be particularly busy, so much so that some manufacturers say that they are unable to keep up with their orders and make deliveries on time. Salesmen have already started out towards the West with spring goods. There is a disposition on the part of the trade to take hold of goods liberally, and there is an evident feeling that prices will be sustained. At any rate, everything warrants such a condition of affairs. There is a large number of Southern buyers in the New York market, more than there has been for quite a while. The hotel registers hold a large number of names of purchasers of knit goods. There are a number of duplicate orders being placed for heavy weight underwear, somewhat more than is customary at this time of year.

Leipzig Exhibition.

MACHINERY IN THE TEXTILE HALL.

J. H. QUILTER.

Knitting machinery is principally shown in the Textile Hall, specially built for this purpose. The knitting machinery exhibits are not numerous, but they are fairly representative of the Saxony industry in this particular branch. Perhaps the most important is that of Messrs. Seyfert & Donner of Chemnitz, who show something like sixteen machines, illustrating the different makes of that knitting machine from the hand machine of the Lamb type to the most advanced of this class of machinery, the automatic narrowing and widening machines. It may not be known by all the readers of your esteemed magazine that this principle of machine is strictly of American origin, the original machine being invented by I. W. Lamb, son of a Baptist minister, whose calling he followed. About the year 1862 he was struck with an idea of using two parallel rows of needles, and uniting the work at each end of the rows, thus forming a circular fabric. Some time was devoted to the development of these ideas, with the result of a working machine being produced about the end of 1863. The first machine arrived in England about 1867, about the same time that a Mr. Biernatzki, of Hamburg, first received the machine in Hamburg. The producing of a perfect stocking was left to a Swiss peasant, who solved the problem of a closed heel, and so made the machine a practical one for making a complete stocking. From this time steady improvement has been made, until recently great developments have been forthcoming, as shown by the exhibit in question.

Among the hand knitting machines

is one of the older Lamb machines, known now as the "Thuringia," named from the district in which they were first built. An improvement of this and of the particular type built by Messrs. Seyfert & Donner, is shown as the "Saxonia-system." Another machine of Switzerland type, but made by his firm, called the "Helvetia," is also shown. A Jacquard machine for hose in fancy design, and six power-driven machines are especially interesting. A patent automatic narrowing machine, with six divisions for making full fashioned seamless pant legs, narrowed down the leg and widened at the seat, is to be seen. This machine is cut 10 needles to the inch, in the needle plate, these being filled with the well known latch needles for which this firm has a reputation. Each of the heads or divisions of the machine are provided with double carriers, for the purpose of making spliced seats and also the inside of the legs. The production of this machine is worthy of notice. Six heads can be managed by one operator making on an average 18 doz. pairs of men's plain full-fashioned pants per week, working 10 hours per day. On the same machine, shirt sleeves fully fashioned could also be made in plain circular fashioned work. The stocking knitter, an improved machine, is shown with 8 divisions, the same making hose or ½ hose, seamless: narrowing the calf, heel and toe, in the French style. The German heel is different to the English system of heel. A narrowing and widening machine making four fully fashioned cardigan jacket sleeves, at a speed of 32 courses per minute, a double head rib top machine for making 1-1 rib top, or 2-2 top, and a double-head sweater machine are all to be seen in operation, the whole, as stated, showing the advances and adaptability of the system of machine in its improved form for making fashioned ribbed and fashioned circular hose and ½ hose, shirts or pants.

Adjoining this exhibit is one showing the making of fabrics in circular elastic ribbed work, as used for ladies' underwear, Messrs. Berger & Co. having three circular rib frames, embroidery machines, linking machines, etc., and a number of cases showing the products of these frames and other garments, the speciality of this firm. The most interesting being a case illustration of the elastic rib fabric for bathing dresses. Here four children are represented on the sea shore with spades and buckets, each having a special design of bathing dress.

Another case, showing the application of warp fabrics for sporting garments, was that having a lady and gentleman cyclist on their machines, equipped for a journey. The lady's dress is particularly attractive, being made from a close two course Vandyke warp fabric from a gray colored yarn, (bloomers and jacket). The jacket is tailor made, with large collar, open front, strapped across, puff sleeves, with collar puffs and wrist bands, trimmed with brown cord trimming. The gentleman's suit is navy blue knee breeches, with sweater in blue plaid, forming large squares on a blue ground. The stockings, caps, etc., are all of knitted materials.

In another case is a large show of ladies' undervests, the attractive styles of finish being worthy of notice, as the crochet work, and the warp net work, separate and combined, made attractive trimmings for the low body vests. Shawls of Apolda make are shown in many styles. The new shell patterns are here shown in quantities. A practical visitor is at once struck with the quantity of movements some of the designs would require to produce.

The writer learns that a new system has been introduced in Apolda, by which any number of movements can be made and at a far less cost, by the use of chain mechanism instead of the Dawson wheel or jacquard, as previously used. These links of a chain are made adjustable, to set for any design and any variable length. Apolda has made a vast stride in this branch of the fancy trade, to the cost of Leicester, which years ago had it almost as a monopoly. Attention to detail, design and blending of colors, is the

chief cause. Upon a careful inspection of the exhibits of this work, as found in different sections of the exhibit, one cannot wonder, as he sees the new ideas and designs brought out, neat and attractive, displaying the superior technical skill of the German designer.

The German sewing, seaming and embroidery machine industry is well represented by Julius Kohler, Limbach, in a smartly built pavilion at one corner of Textile Hall. Here is a stand containing some ten machines, each a speciality of this firm. These include the ordinary German cup seamers for hose and cardigan jackets. One machine, especially for sleeves of cardigan and coarse vests, has an apparatus for turning back the cut edges and so making a safe and neat seam. This is also adapted to produce three distinct seams. For the shawl trade there is a machine for putting on fringes, giving a hidden seam, from the outside.

A new developement is a circular point linking machine having outside needle and inside hook, each carrying a thread and producing a double thread linking stitch (not an overseam), a neat seam, elastic and perfectly secure, is the result. No machine of this kind has as yet been exported; nor has another and perhaps a more interesting, machine, exhibited for the first time, of an overlock kind. This latter is built on the ordinary sewing machine principle for trimming the edge and joining by an overseam. One needle and two loopers are used; one carrying a thread, feeds it to the second looper, which guides it over an adjustable guide, which regulates the size of the stick, so that any fabric can be joined by adjusting the stitch guide. An important point claimed is the quick running of 3000 sticks per minute, and the capability to use any kind of sewing thread, even ordinary knitting threads.

The crocheting machine for making and fixing a crochet edging to such garments as elastic ribbed vests, etc., is shown, and also the chain machine for making the chain stitch cord, used for making the crochet work. Some fine specimens of the different work are shown, and the machine being in operation, makes the exhibit worthy of a visit.

Circular machines, both latch needle and the German system of bearded needle, and circular knitting machines formed the exhibit of C. A. Roscher, Mittweida. German bearded needle circular frames, included a plain machine fitted with design wheels; A stripe frame, with special striping tackle for taking in and cutting off different threads, to produce different stripe work, designs, etc.; A new twist needle frame for making a special twist fabric, as now being used for the German military. The twisting of the loops are caused by a special arrangement of sinkers, in place of the ordinary sinkers. A similar adaption of different wheels and sinkers on another machine, shows the method of producing open net fabrics. An interesting machine is a circular frame, with latch needles, on the suspending principle, with the work running downward and outside the circle of needles.

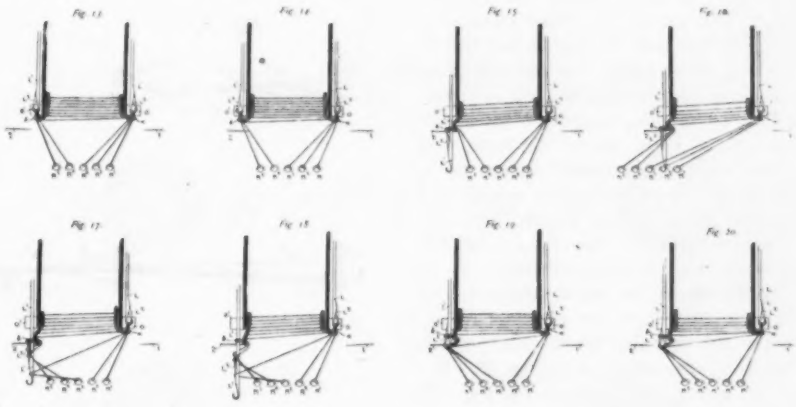
Circular rib machines for making elastic rib vest fabrics, etc., are shown. The patented mechanism for controlling the machine and stopping the same at the breaking or discontinuing of any thread is particularly ingenious. The same mechanism is shown, applicable to a thirty feeder frame for working from thirty different threads to produce stripe work. A Turkish cap machine as used in the Austrian trade is making coarse fabric, cut and milled to make the Turkish cap, worn in that district.

Latch needle circular frames making mantles for the incandescent light lamps, necktie fabrics and asbestos packing, are each interesting, as are the ordinary circular knitting machines, both stationary needle cylinder and revolving cam ring. A plain machine, and an 84 needle ribbed machine, illustrate the ordinary hand machine or domestic type. Another machine was supplied with special attachments for introducing different colored threads for fancy legged hose, garters, stripped hose, etc. An auto-

matic take up is applied. To produce circular rib top, a rib machine is shown having mechanism for producing the required slack courses and welt. Here again was applied the automatic take up.

Warp Knitting Machine.

An article appeared in our July issue on the "Future of Knitting," by J. H. Quilter. That portion of the communication relating to the making of plushes and velevts on knitting machines has called forth a communication from Thomas Haskard, Vineland, N. J., in which the method mentioned by Mr. Quilter of making these goods is criticized to the extent that it is not by any means the best and latest one. Special reference is made to the illustrations, numbers 9, 10 and 10a. Mr. Haskard thinks that the method described is slow and more expensive than a certain invention of his own. Mr. Haskard's machine for making plushes, velvets, etc., he represents as quite different in its plan of operation and one which will produce the goods in larger quantities and at a lower cost. Mr. Haskard has sent us a number of sample goods that have been made on his machine, which is patented in England and Germany. Mr. Haskard's description and illustration of his machine is as follows, the publication of it in this number being its first appearance in print. We give it to our redaers trusting that it will prove to them of interest.



This machine is so constructed that it will make two pieces of plush or pile fabric at one and the same time. The two backs or foundations of the goods, and the plush or pile between them, are formed simultaneously therewith, the plush or pile being afterwards cut or divided, thus making the two pieces of goods. The framework of the machine is of ordinary construction and is similar to that generally employed for knitting machines, and for the purpose of forming the two pieces or backs, two sets of needle bars are provided of similar construction and to them is imparted alternately a vertical reciprocating motion, by means of cams in the ordinary manner.

When the needles have been carried down by the needle bars far enough to let the guides wrap around the yarn above the hook of the needle, but not far enough to let the previous loop liberate the latch, so that it keeps it from closing and the stitch from being thrown off without forming another loop, then when the yarn is wrapped around the needle and got to the back of the needle, it then finishes the downward stroke so as to let the previous loop get above the latch of the needle. Each previously formed loop is prevented from being dragged down by its needle in the downward stroke, by means of points. As the

material is being formed, it passes up between the trick bars, which are so adjusted that they can be set at the proper distance from each other, to form a long or short plush or pile, and, when it is desired to separate the two pieces as they are made on the machine, a knife is so placed that it cuts the pile into two distinct pieces of goods; these are drawn up by porcupine rollers operated by a worm gear, and delivered thence into a proper receiver.

Fig. 13 represents the separate parts at the time when a new row of meshes begins to be formed. The loops "b" which have just been formed, are hanging in the needle "L," in Fig. 14, the points "Z" having moved forward till just under the needles "L." The needle "L" then sinks into the position seen in Fig. 15 and whilst moving downwards the point holding up the work, causes the loop to throw back the tongue, holding it up whilst the guide bars move through and wrap the thread around, as shown in Figs. 16 and 17. Then the needle bar moves down as in Fig.18, the loop then being above the tongue of the needle; then moving upwards, as in Fig. 19, where the point comes out as in Fig. 20. Then the needle bar finishes its upward stroke and comes back to its position as in Fig. 13.

The gaiting of the bars for Figs. 13 to 20, is shown in Figs. 24, 25, 26 and 27, which also show that the threads "m1," "m2" are gaited so as to take two needles, one at the back and one in front, thus forming the foundation or the body of the cloth, "m3," Figs. 24 to 27, taking the thread only across the front of the needles. This movement is reversed on the opposite side by corresponding mechanism, making the opposite foundation or body, and "m3" throwing across the front of one needle same as before, which will be readliy seen by studying the figures named.

Fig. 23 is the way the threads are knitted together, the threads "B B" forming the foundation or body of the cloth. The thicker black lines are the yarns forming the plush or pile, the plush threads "R" covering themselves in the foundation with the meshes of the threads "B," and at the point "R R" pass out of the foundation in order to pass over it to the other foundation or body of the cloth; thus forming the cloth, which comes in contact with the knife, which cuts

Fig. 23.

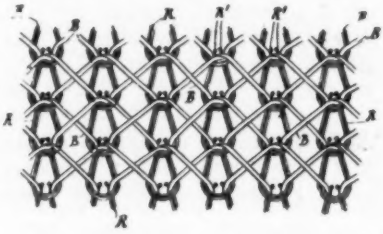


Fig. 24.

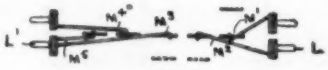


Fig. 25.

Fig. 26.

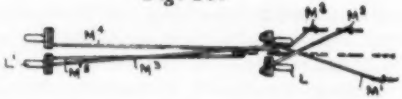
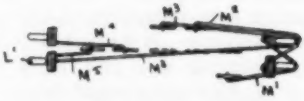


Fig. 27.



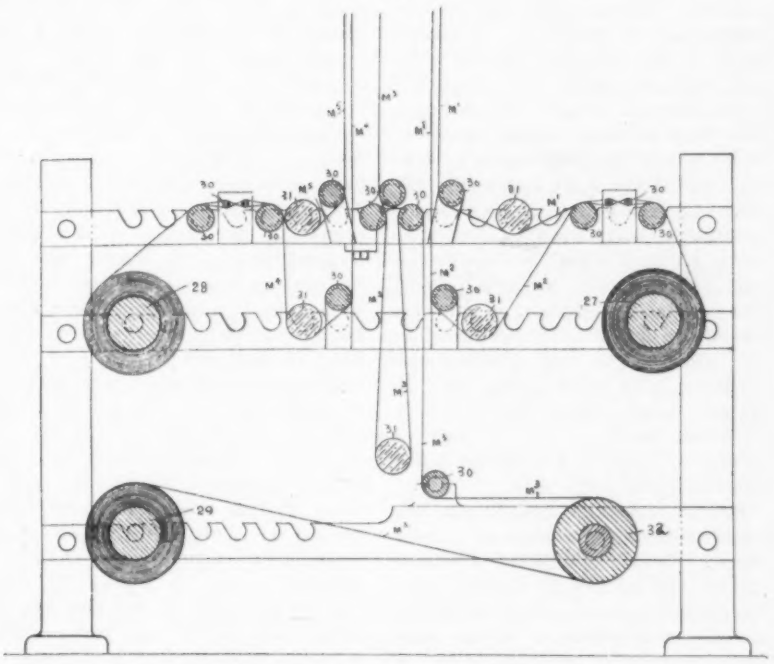
the plush or pile as already explained.

Fig. 32 represents the warp as threaded up before going to the guides. The rollers No. 30, are all idle rollers, so as to let the threads pass over easily. The other figures, "m1"

"m2," "m3," "m4," "m5," being the threads corresponding to the threads in Fig. 13 to 27.

In Fig. 32 rollers No. 31 are weights to take up the slack threads and keep them at an equal tension. Roller 32, in Fig. 32, is a roller covered with plush to feed the pile from the beam. The knife used to cut the plush threads must be of the very best material and very sharp, and, on account of the flexible nature of knit goods, must be fixed in a thoroughly rigid

Fig. 32.



position and the cloth stretched wider when in contact with the knife than when it leaves the needles. To make a very fine cloth, two fine count threads in each guide are much better than a single count equal to the size of the two threads.

Fig. 23 represents the quickest way to make plush or pile goods, as you make a loop at every motion. Though this is liable to finish, a little ribby in appearance, it is still quite even. To avoid this, the cloth is made by the needle bars making a row of loops every other motion, going from Fig. 13 to 18 and then reversing to the upward motion, which leaves the loop already formed inside the hook again.

Rudiments of Framework Knitting.

From "Technology of Framework Knitting," by Gustav Wilkomm.

The combinations of the threads in the different fabrics are pretty nearly as follows. In woven goods the threads lie, crossing at right angles alternately under and over each other (less frequently two are twisted around each other without being bound fast together. Netted goods, whether worked by a machine or by hand upon a framework, have the threads crossing each other, either at right angles or obliquely, but at the crossings fast bound together, i. e., knotted. Bobbin net is produced from a warp, whose threads in series of two or more, are brought together and twisted around each other. Frame-

work knitting differs essentially from all these fabrics, inasmuch as the threads are bent into regularly recurring loop-like forms which hang in each other, and are called loops. By the expression "loop" is meant a sort of noose bent out of the thread in the form of two symmetrical letters "S" standing opposite each other, which is kept in this form by placing other threads at the places at which the thread of the two letters "S" is bowed round. As the latter, for producing the form of the loop does not lie stretched in a straight line, but bent in several different directions, such a combination of loops can be easily drawn in any direction, but the stiffness, and also, partly, the elasticity of the thread, always try to bring them back to their original position, that is to say, the fabric itself is elastic. This is the most important property of looped fabrics, as they are, in consequence, best suited for those articles of clothing which lie close to the body. Framework knitting, therefore, produces a fabric, or articles which are elastic in every direction, but which have this disadvantage compared with other goods: that a broken thread when the fabric is stretched, easily draws through a number of loops, and occasions a disproportionately large hole.

Only knitting and crochet give the same combination of loops as hosiery fabric. The knitted fabric is almost exactly like framework knitting, and the crochet more like the warp fabric. An important difference in the manner of working is here perceptible, in knitting and crochet, each new loop is produced by drawing the thread through the old one; in framework knitting the reverse is the case, the thread is first bent like a loop, and the old loops pushed over to maintain the form. In knitting and crochet, only one loop is produced at a time. In framework knitting, a whole row of loops, as long as the fabric is wide, are made at a time side by side, and drawn vertically through the old row. In framework knitting, a hook, also called a needle, is required for every separate loop in the breadth of the fabric; and besides these, other pieces are necessary, as the bending and moving of the thread is not worked directly by the hand. The apparatus for making the loops is therefore composed of several parts, which are not quite the same for framework knitting as for warp fabrics.

Framework knitting is, like knitting, made with one thread only; for the laying and working of this thread during the production of each course, the following parts are necessary. The needle is sometimes called the frame, or hooked needle, to distinguish it from other wires used in framework knitting, and to which the name "needle" is also given. For framework knitting, as many needles are generally required, as there are loops or stitches in the breadth of the fabric, a considerable number compared with those required in knitting. They are so arranged that they lie all parallel to one another in a slightly inclined plane; their hinder ends are fastened on to a bar, and then hooked ends stand free in front. These needles were formerly made of iron wire, but are now mostly made of steel wire; their manufacture is an industry of itself, which nevertheless is closely allied to framework knitting, for not only the framesmith requires them for new machines, but also the framework knitter himself requires such needles very often, to replace those which have become useless. As every mechanic ought to know, not only how to use his tools, but also how to judge their quality and repair them, so is the knowledge of the manner of making the elementary parts of his machine necessary to the framework knitter.

The manufacture of needles is usually hand work; machinery has been tried, but as yet without success. The wire is taken off the roll, and cut into pieces of equal length by shears. These pieces are passed through rollers to make them as straight as possible, and the groove is then made in the proper place by a chisel. For this purpose each piece of wire is laid in a shallow channel in the bed of a press, having above it a chisel on a

slide. This chisel is either struck with a hammer, or pressed by means of a screw, so that the groove is made on the round shank by the wedge-shaped tool. A machine for performing these operations, that is, cutting off the wire into fixed lengths and making the groove, was invented in 1858 by Gottlebe, a framesmith in Wittgensdorf, Saxony, but it has not been regularly adopted. The pieces of wire are now filed to a point on one side only, so that on one side the outer hard skin of the wire remains, in order that when this end is bent over to form a hook, the curved part may be as elastic or springy as possible. An attempt has been made to replace the hand filing, which must be done to each needle separately, by cutting them in a shaping machine, but, up to the present time, without success. The points are sharpened symmetrically by a grindstone, a number of the needles being held in the hand at the same time, and drawn through the fingers so as to polish the part which has been filed. The bending of the long hook was formerly almost entirely done by hand, by means of a pair of pliers which had a stop for the proper length of the part to be turned over. This length varies from 8 to 20 millimetres for the finest and coarsest sorts. The beard is not quite parallel with the shank of the needle, but bends a little away from it; the point, however, is turned downwards. Sometimes the beard is made into a curved line with the hand pliers, especially in iron needles, whereby greater elasticity is obtained, or in needles for polka-rib machines; also for frames with pelerine machines, which some times hold the loops of thread in the curved end of the hooks, upon which account the space of the hook is somewhat narrowed. The hinder end of the needle is now beaten flat in a grooved anvil with a hammer, when it is intended to be cast in leads, but those that are intended to be fixed without leads have a short piece bent at right angles with the pliers in such a direction as to bend exactly the opposite way to the hook at the other end. Steel needles are generally hardened. They are put in small quantities into wrought iron vessels (pieces of gun barrel which are welded up at one end and provided with a handle, and can be closed at the other end by a screw, so that no air can enter), and heated to a red heat; the vessel is then opened, the needles are shaken out into melted fat and afterwards dipped in oil, by which they acquire the necessary degree of hardness. Lastly, the needles are polished, by being put in a revolving barrel with a quantity of sawdust and filings, or shaken in a leather bag. During this operation they become hooked into one another, and require careful separating, and sometimes straightening.

The sinker is a thin piece of iron or steel plate. As many sinkers are necessary as there are needles, and every one of the former hangs between two of the latter. As the side view of the sinker somewhat resembles the human countenance, the forward point is sometimes called the nose, but generally the nib, the hinder one the chin; but usually the two together are called, in English, the "nib," and the projection below the belly groove, the throat of the sinker. The manufacture of sinkers is not so much a separate industry as that of needles; it is seldom carried on alone, but generally as a branch of the framesmith's business. The materials of which sinkers are made was formerly iron plate, but it is now mostly steel; formerly they were cut out of a piece of rough rolled plate by a pair of shears, the form having been drawn by laying a finished sinker upon it, and tracing it, afterwards polishing it bright; now, ready polished steel plate is used and pressed out by hard steel stamps. In order that all sinkers of the same kind should be exactly of the same shape, they are placed in small quantities of about ten, firmly between two strong hard steel plates of exactly the desired form filed to the same size, and afterwards polished at the edges with a wooden or steel tool. If the sinkers are carefully used during their working, and protected against blows, the iron or soft steel plate formerly used would be sufficiently strong. For more modern stocking frames with sinkers of different form, however, more strength has been required, and this has rendered the use of hard steel plate necessary. The attempts to harden and temper the finished sinkers have not yet given satisfactory results, on account of the warping during the hardening, and the difficulty of attaining the proper hardness.

POWER DEPARTMENT

O. R. YOUNG, M. E., Editor.

Chestnut Hill Pumping Station of the Boston, Mass., Water Works.

LOUIS M. SCHMIDT.

One of the departments of the City of Boston of which the city may be justly proud is the Water Department. The record of this department has always been a credit to itself and to the community which it represents. In carrying out the object of its existence, namely, the supplying of a vast population with water, it has at the same time shown a capability of catering to the aesthetic taste, as throughout the system, utility and beauty are combined.

Especially praiseworthy are the results achieved in the region about Chestnut Hill reservoir, including the two storage basins, the Lawrence and the Bradlee, and the pumping station itself.

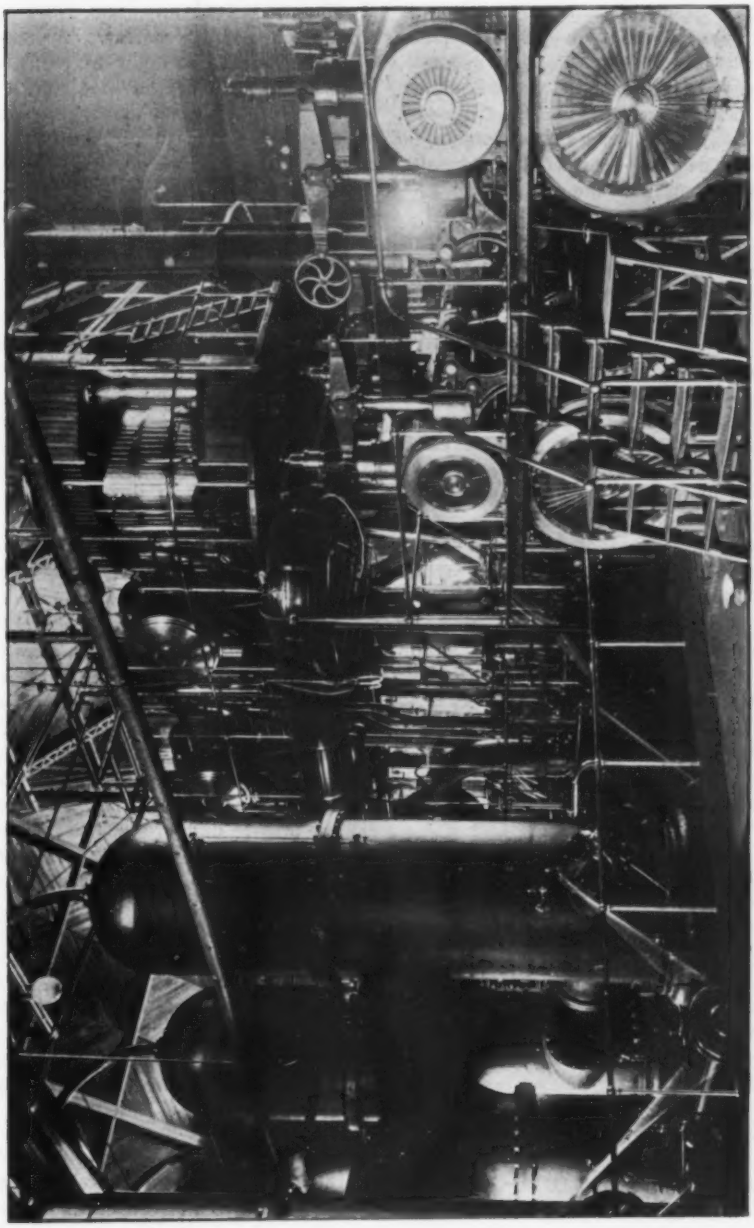
While our readers may be especially interested in the technical part of the plant, a few words of general description may assist in understanding the situation. The reservoir antedated the pumping station by a number of years. The history of the reservoir may probably be considered as beginning with the following interesting quotation taken from a history of the Boston Water Works, published in 1876, by Mr. Desmond Fitzgerald, the present superintendent of the Western Division, under date of 1862: "The first mention of a new storage reservoir for the city will be found in the annual report to the Water Board for 1862. They recommended that one should be built whenever the affairs of our country are in a more prosperous condition."

Work on the reservoir began in 1866 and was completed in 1870. The source of supply at that time was Lake Cochituate, which has been used as a source of water supply for the City of Boston since 1848. Since then, the Sudbury system has been added. This has been extended at various times, and now consists of six storage basins, numbered respectively from one to six, located at different points in the Sudbury river and its tributaries.

From these sources of supply, the water comes to Chestnut Hill and Brookline reservoirs by gravity, and is at a sufficient elevation to supply what is called the low service. The odd numbered basins, 1, 3 and 5, extend in a north-easterly direction, and the even numbered basins, 2, 4 and 6, extend to the south and westward. Lake Cochituate water shed contains about 19 square miles, and includes the greater part of the town of Natick, and portions of adjacent towns. The Sudbury water shed contains about 75 square miles; accordingly, it is about four times as large as that of Lake Cochituate, and includes the town of Southboro and large portions of the surrounding towns. The territory of these supplies is situated from 17 to 35 miles west of Boston. The two systems were connected and combined in 1894, and gave a dual supply of 46,560,000 gallons, or at the rate of 99.8 gallons per capita.

The supplies from these two systems are conducted through two aqueducts. The Cochituate aqueduct is 14.6 miles in length, built of brick masonry, laid in cement, except two tunnels and the crossing of Charles River, near Newton Lower Falls. It is egg shaped, with the large end down, 5 ft. wide, 6.33 ft. high inside, and 8 inches in thickness. It has a slope of 3 1-6" per mile, and has a capacity of 18,000,000 gallons per day. The two tunnels are

located respectively at Newton, 2,410 ft. long, and at Brookline 1,150 ft. long. below the regular grade. The pipes cross the river on a bridge of ham-



CHESTNUT HILL PUMPING STATION, BOSTON WATER WORKS.

The water crosses the Charles river valley through a siphon of iron pipes, two 36″, one 30″, and one 40″, 52 ft. mered granite, with three elliptical arches of 30 ft. expansion, 7½ ft. rise, and a width of 21 ft.

The Sudbury aqueduct, between Farm Pond and Chestnut Hill Reservoir, is 15.9 miles long, of special shape, 9 ft. wide and 7.67 ft. high inside, equivalent to a circle of 8½ ft. diameter. It has a slope of one ft. per mile, and a capacity of 100,000,000 gallons per day. The upper portion, from dam No. 1, to and across Farm Pond, 1.5 miles, has a slope of 2.323 ft. per mile, and the interior dimensions are 7 ft. wide by 6.88 ft. high.

On Fisher Hill, the reservoir which receives the water from the Chestnut Hill pumping station, there is one basin, rectangular in shape, at high water, grade 241 ft., having a depth of 18 ft., an area of 3.14 acres and a capacity of 15,500,000 gallons. The inside slope is covered to above the high water line with a layer of puddle 2′ thick. The lower portion of this is covered with 9″ of Portland cement. Above this, the clay puddle is stepped back and the slope is faced with paving stone 15″ thick, laid on a bed of broken stone 1′ thick.

To prevent slipping of the puddle or paving, a footing of American cement concrete is placed at the toe of the slope. For a distance of ten feet from the foot of the slope, the bottom is covered with a layer of Portland cement concrete, 6″ thick. The bottom of the reservoir is covered with puddle 2′ thick.

As a scale preventive, the boilers are occasionally treated with kerosene. After the water has been run out of the boilers, about two pailfuls of kerosene are run in, the boilers are gradually filled, then heated up, after which they are run down. Little trouble is found, however, from scale, the boilers after a six months run being found to be in first class condition.

The chimney is located in the extension of the coal-house. It is 150 feet in height above the floor of the boiler-room, and the foundations extend to solid earth at a depth of 26 feet. The foundation is 27′ 10″ square at the bottom, and is stepped into 20 feet square at the grade of the bottom of the flue where the brick masonry begins.

The foundation is of Portland cement concrete to a height of 6 feet above its base, and the upper portion is of rubble masonry laid solid in American cement mortar. A door is placed in the chimney at its base for the removal of the soot, and an opening for a second smoke-flue has been built and bricked up until needed. The chimney is drawn into a circular form above the opening for the flues. The outside shell at the base is 15′ in diameter and is 28″ thick; it has an outside batter of 0.288 inches per foot, and its thickness is gradually reduced to 16″ at a point 96′ above the floor. The flue is circular, its inside diameter is 5′ 6″, and its wall is 12″ thick at the base and 4″ at the top, which is 20′ below the top of the outside shell. The chimney has a cast-iron cap, and is fitted with two ½-inch copper lightning rods.

The main suction pipe is 30 inches in diameter, with 24-inch branches to each pump. The discharge pipe is 24 inches, connecting to the 30-inch main outside, which runs to Fisher Hill. The diameter of the pump plungers is 25 inches, and the stroke 3 feet. At the normal speed of 18.5 revolutions per minute the capacity of the pumps for 24 hours is 8,000,000 gallons each. The coal consumption is about 1.75 lbs. of coal per h. p. hour. These pumps, at the present day, are held in reserve for emergency use, the No. 3 pump last installed being of ample capacity for the duty required.

The horse power of the engines at the rated speed of 50 revolutions per minute is 575. At the present speed of about 37 revolutions per minute it is working at about 425 h. p. The duty for which the engine is good is to raise 20,000,000 gallons of water 137.5 feet in 24 hours.

—Before bleaching and dyeing were added as kindred industries calico printing was the foundation of great fortunes, and the well-spring, in some historic instances, from which great families rose.

The Selection of a Steam Engine.

In a lecture on "The Selection of a Power-plant Steam Engine," by Professor Hutton, recently delivered in connection with the Henry Electrical Society, three questions were particularly considered: The arguments for and against high and low-speed engines, automatic cut-off engines as contrasted with throttling engines, and the arguments in favor of condensing engines. The lecturer did not have time to discuss compound engines, as was intended. The principles underlying work and heat motors and a thorough explanation of the well-known formula H P = PLAN + 33,000 were discussed.

With horse-power fixed, both A (piston area) and L (length of stroke) would diminish as N increases. Engines embodying this feature are nam ed high (rotative) speed engines.

Such engines have a small cylinder volume, because they are frequently filled; they also have small cylinder lengths and diameter, which makes the engine light.

The small cylinder lengths make a short engine, because the crank and connecting rods are correspondingly shortened. The small diameter of the cylinder, however, increases the strain on the piston rod and connecting rod and lightens them. The diminished weight of reciprocating parts secures a steadier and quieter running without increasing the initial pressure. Summing up the above points, we may say that the weight and bulk of the engine are diminished. The horse-power can be increased without decreasing the weight and bulk by increasing the pressure.

High-speed engines can be run with less change of speed ratio in the transmission, and, in fact, in some cases without transmission gearing, being direct connected.

When the engine speed exceeds 120 strokes per minute, each revolution is made in less than one second. The variation, therefore, in effort or resistance is more promptly met and adjusted to secure constant speed. The variation of effort and resistance has not sufficient time to get away from the mean effort of the minute before a readjustment occurs.

The regulation and governing mechanism by which the effort of the steam and the resistance are adjusted to each other does its work more promptly in a high-speed engine than where it derives power from masses of more weight at less velocity. The heavier masses are more sluggish from inertia and have more friction from their weight.

The term "high speed" has been generally used in the sense of high speed of rotation, and not necessarily in the sense of high speed of piston. If L and N (number of strokes per minute) be increased together, but not N alone, there results a design of engine of small diamter of cylinder, but of relatively long stroke. Of this type of engine the Corliss stands as a prominent example in stationary practice. Here N is kept low on account of the valve gears. The typical beam engine used in river boat practice, and also pumping engines, are other examples of this class of engine, which are generally known as slow-speed engines. The arguments in their favor are the arguments to be used against the high rotative-speed engine. Some of the features are as follows:

Increasing L relatively to A, and keeping N low, diminishes the loss of cylinder condensation. The clearances do not have to be so large. Port areas can be cut down, because the linear velocity of the steam is less. The last two features diminish clearance wastes, less steam being lost per stroke, and there are fewer strokes.

In the high-speed engine with short traverse, all bearing surfaces are traversed more frequently, and the weight is concentrated over a smaller area. Close attendance and excessive lubrication are therefore required, and the workmanship of such engines must be of a particularly high standard, making them costly. When an

accident happens to a high-speed engine, the high speed in many cases prevents any possibility of prevention.

In summing up these various features, the result would seem to be that if close regulation, light weight, and direct connection are worth most, high rotative speed should be used; but if economy, long life, and peace of mind are worth most, then the long-stroke, slow-speed engine should be used.

A piston speed below 500 ft. per minute may be considered low; from 600 to 800, moderate; and above 900, high.

Some automatic governing device must be provided to meet the demands of varying load on the engine. In general practice this is accomplished by throttling the steam supply or by a variable steam cut-off valve. The mean steam pressure on the engine cylinder is the only variable quantity that can be controlled practically.

The diagram of effort in the cylinder is shown by the indicator diagram. The energy of the steam expended in the engine is represented by the area of the diagram. The variation of height in this diagram shows a variable initial pressure such as would be produced by throttling. In such cases the steam cut-off remains constant, and such engines are known as throttling engines. Automatic devices may be used to operate the throttle, or it may be operated by hand.

The area of the diagram can also be varied by varying the cut-off at various points of the stroke—that is, the length of time during which the maximum pressure is maintained. In such engines the valve controlling the steam inlet to the cylinder is made variable so that at low loads the steam is cut off at a very small percentage of the stroke, while at larger loads or full load, the valve remains open for some time.

The advantages in favor of throttling engines may be enumerated as follows:

They are cheap to build and to buy; the valve gear may be exceedingly simple; the steam follows with maximum effort for a long distance, and is less irregular. Superheating and drying of the steam occur when the high temperature steam suddenly finds itself at a lower pressure, as occurs when throttling is resorted to. This produces less cylinder condensation than where the automatic cut-off is used. The disadvantages of the throttling engine are as follows: They are less sentitive to instantaneous variations; they do not regulate as closely; the exhaust carries away more heat because the maximum has lasted through a comparatively long portion of the stroke, and therefore a lower efficiency results from the steam used.

The advantages of the variable cut-off engines are as follows: The steam effort is controlled at each stroke and keeps the speed quite fixed; the full boiler pressure acts without waste of energy upon the piston and without loss from friction due to throttling; superior economy is possible with such engines from less weight of steam than would be used in the throttling engines.

Among the disadvantages of the variable cut-off engines are the following: - As the maximum steam pressure in the cylinder is always at one point, wide differences of energy exist between the two ends of the cylinder; heavy fly-wheels are therefore necessary, with resultant increased friction; the valve gear of such engines is usually complicated, making the engine costly to build, aside from the necessity of superior construction in the other elements of the engine; the low final temperature or pressure of the exhausting steam in the cylinder increases the cylinder condensation; in some cases the expansion is more than complete, necessitating negative work.

In a condensing engine devices are provided for creating a vacuum in an exhaustion chamber into which the steam from the engine cylinder passes. By this method the atmospheric back pressure is eliminated and the effective pressure of the steam is therefore greater. Other advantages of such engines are: Smaller cylinder for same

power; complete expansion from same initial pressure and yet earlier cut-off, and less steam per stroke from short admission; less heat is rejected at the exhaust; a higher efficiency is possible because the final temperature of the exhausted steam is less. Condensation gives pre-heated water for boiler feeding, as the latter must be used in most cases for condensing the exhausted steam in the vacuum chamber.

Amongst the disadvantages of condensing engines are: The cooling of the cylinder by a lowered final temperature makes an increased initial condensation. The apparatus to maintain the vacuum in the exhaustion chamber is usually complicated and necessitates power for its operation. Where the exhaust steam is returned to the boiler, trouble frequently occurs from oil therein, which should be entirely separated from the water before the latter is fed to the boiler.

The condensing engines are usually limited in their application to places where cooling water can be had in large quantities. Such engines are generally operated at low rotative speed, which is limited by the condensing appliances.—[The Mechanical World.

Reversing Gears.

JOSEPH H. McNEILL.

In one particular steam engines may be divided into two classes, namely: Those which rotate in one direction only, and those which will rotate in either direction.

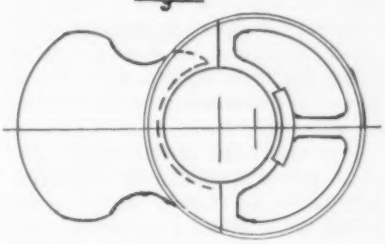
When it is required to change the direction of motion of a steam engine—that is, to have it a reversing engine—it is necessary to have some mechanism attached to the machine to effect the change.

The loose eccentric is one method employed, but its application is confined almost altogether to the engines of paddle-wheel steamers with single engines running at a moderate speed.

In Fig. 1 is shown a loose eccentric, which is merely an ordinary eccentric, only fitted with balance weights and stops.

To reverse the engine from, say, go-ahead to go-astern gears, the eccentric rod is thrown out of gear with the rocker shaft and the valve worked with the reversing bar, by hand, in the direction—leading the crank—

Fig. 1

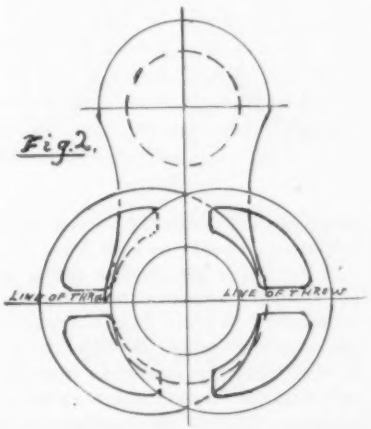


suited to the go-astern motion of the engine.

The eccentric, being balanced and loose on the shaft, does not revolve until the stops on the shaft, corresponding to the go-astern gear, come in contact with the stops on the eccentric. Then the eccentric revolves with the shaft, the eccentric rod is thrown into gear, the reversing bar removed, and the engine goes astern until the steam is shut off and the direction of the motion is changed in precisely the same manner as to go-ahead.

Loose eccentrics are used on ferry

Fig. 2.



and river boats, where quickness of handling is of prime importance, and they are also used on disconnecting paddle engines.

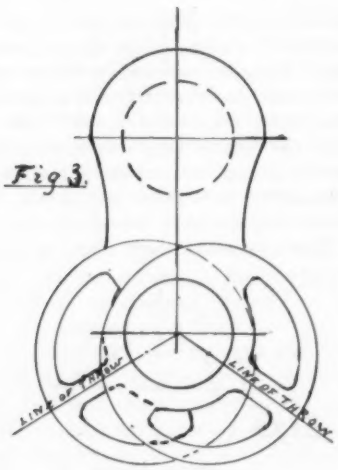
There are also several types of patent gear in use for reversing engines, the better known of which are Joy's, Marshall's and Hackworth's.

The reversing gear, however, in general use, is the Stephenson link motion, the advantages of which are its simplicity, and also its permitting the steam to be worked more expansively.

The Stephenson link consists of a radial link, from the convex side of which the link block—which is free to move—is connected to the end of the valve spindle.

From either end of the concave side of the link is attached rods which connect to the eccentrics; one for going ahead, the other for going astern.

By travelling the link over until one of the rods is in line with the valve spindle, the valve is put in position to move the engine to correspond with the position that the eccentric, to



which tht rod is attached, bears to the crank.

If the valve has neither steam lap nor load, the lines of throw of the two eccentrics will stand diametrically opposite to each other, as shown in Fig. 2. But when the valve has steam lap and lead, the lines of throw of the eccentrics approach each other, as in Fig. 3, and therefore the greater the amount of lap and lead, the nearer the lines of throw are to each other.

In other words, the distance between the lines of throw of the eccentrics is 180 degrees minus twice the angle of advance.

—The linen trade generally is, in fact, stationary, if not declining. Belfast is now turning out cloth in which the warp is all cotton, while only one weft thread in three is flax. And Ulster has gone in so largely for unions and all-cotton goods during the past decade that it is doubtful whether the province would enjoy its present prosperity had linens been relied upon exclusively. What is true of Ulster in this respect is also true of other linen centres.

—The Southdowns can trace their ancestry beyond the time of William the Conquerer, and were known at and before that time as grazing over the southern parts of England, from the eastern shore to the extreme point of Cornwall, and particularly on a long range of low chalky hills of Sussex known as the South Downs, whence their name.

—In China, the mills confine themselves to spinning Nos. 10s, 14s and 16s. Occasionally there is a demand for 18s, but this is a decided exception. But if finer yarns should be made later, American cotton will be needed, as neither the Chinese nor Indian cotton will do.

—A London paper of 1768, recorded three convictions against tradesmen's wives for wearing chintz gowns on the previous Sunday, and the Lord Mayor, before whom the culprits were brought, fined each of them £5.

—The production of silk is the greatest industry in Japan, and the exports of the raw material alone amount to more than one-third of the whole exports of the country.

—In France, in 1737, a royal ordinance forbade the common people to use calicoes, which were reserved for the nobility.

COLORS AND DYEING.

Dye Recipes for September.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE No. 129.

Violet on Woolen Yarn.

Violet on 100 lbs. woolen yarn.

Prepare dye bath with

½ lb. Acid Violet BB.
(John J. Keller & Co., 104 Murray St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Oil of Vitriol.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

Acid Violet B. B. dyes a fine rich violet shade on wool, taking onto the fibre slowly, and does not crock or rub off. It is fast and will combine with all acid colors.

RECIPE No. 130.

Black on Woolen Yarn.

Black on 100 lbs. woolen yarn.

Prepare dye bath with

5 lbs. Soudan Black No. 2.
(Sykes & Street, 85 Water Street, New York.)
4 lbs. Oil of Vitriol.
10 lbs. Glauber's Salt.

Enter in yarn at 140° F., bring to boil while turning, and turn to shade at that heat.

Soudan Blacks are very fine for wool, exhausting the dye bath slowly. The color is fast, and penetrates through the fibre. It does not crock or rub off.

RECIPE No. 131.

Blue on Woolen Yarn.

Blue on 100 lbs. woolen yarn.

Prepare dye bath with

8 oz. Azo Acid Black R.
8 oz. Azo Acid Blue B.
(Victor Koechl & Co., 79 Murray St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Oil of Vitriol.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

Azo Acid Blue B. and Azo Acid Black R., work well in combining for grayish blue shades; also for dark navy blues and blue blacks. They work evenly on the fibre. (See Recipe 116 for a dark blue).

RECIPE No. 132.

Brown on Cotton Yarn.

Brown on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Direct Fast Brown B.
1 lb. Direct Deep Black R.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)
20 lbs. Common Salt.
1 lb. Sal Soda.

Enter in yarn at boil and turn one hour at that heat.

By combining these two colors together, fine shades of brown can be obtained, comparing most favorably with cutch browns.

RECIPE No. 133.

Bright Red on Woolen Yarn.

Red on 100 lbs. woolen yarn.

Prepare dye bath with

3 lbs. Milling Red F. R.
(Wm. J. Matheson & Co., Ltd., 178 Front St., New York.)
5 lbs. Acetic Acid.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

Milling Red is an exceedingly fast color on wool. It stands fulling and

washing. It is very soluble, and exhausts slowly, resulting in level dyeing. Bisulphate of soda can be used as a mordant, also.

RECIPE NO. 134.

Olive Green on Worsted Yarn.

Green on 100 lbs. worsted yarn.

Mordant for 1 1-2 hours at boil with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Wash and dye with

10 lbs. Extract Fustic Liquor L.
1 lb. Extract Logwood N.
(Stamford Mfg. Co., 133 Front St., New York.)

Enter in yarn at 160° F.; bring to boil while turning, and turn to shade at that heat.

Extract Fustic Liquor L. and Extract Logwood N. will be found to be very pure and concentrated extracts, well adapted for wool, cotton and silk dyeing. (See Recipes 72 and 124 for other shades of green from this same combination. Consult Recipes 28, 34, 36, 60, 88 and 100 for colors from fustic and logwood extracts used alone).

RECIPE NO. 135.

Red on Worsted Yarn.

Acid Grenadine on 100 lbs. worsted yarn.

Prepare dye bath with

4 lbs. Acid Grenadine.
(John J. Keller & Co., 104 Murray St., New York.)
5 lbs. Oil of Vitriol.
20 lbs. Glauber's Salt.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

Acid Grenadine dyed with 4 per cent., as above, shows a dark and bloomy shade of color. It is fast against sun, air and fulling, making it a valuable color. It combines readily with other acid colors, and works on the fibre slowly. (See Recipe 118 for another shade of red).

RECIPE NO. 136.

Dark Blue on Cotton Yarn.

Dark Blue on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Direct Blue B.
1 lb. Direct Black K.
(A. Klipstein & Co., 122 Pearl St., New York.)
20 lbs. Common Salt.
1 lb. Sal Soda.

Enter in yarn at boil, and turn one hour at that heat.

Direct Blue B. and Direct Black K. work well in combination. Very cheap and dark blues can be made by combining the above two colors. (See Recipes 68, 95 and 104 for shades of blacks and slates from Direct Black K., used alone, and Recipe 119 for a medium green, in combination with Direct Green Y.)

RECIPE NO. 137.

Blue on Worsted Yarn.

Blue on 100 lbs. worsted yarn.

Prepare dye bath with

3 lbs. X L L Blue.
(Read Holliday & Sons, 100 Williams St., New York.)
4 lbs. Oil of Vitriol.
10 lbs. Glauber's Salt

Enter in yarn at 140° F., bring to boil while turning, and turn to shade at that heat.

X L L Blue being an acid color will combine with other acid blacks in producing dark shades. The color produced in the accompanying sample, as will be noticed, has a fine indigo tinge. The color is fast, not rubbing off.

RECIPE NO. 138.

Brown on Cotton Yarn.

Brown on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Chromanil Brown G G.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
30 lbs. Salt.

Enter in yarn at boil, and turn one hour at that heat.

Chromanil Brown G G is more of a yellowish shade than the R brand, and is just as fast. It can be developed with bichromate of potash and blue vitriol, which makes it a very fast color. (See Recipe 106 for a reddish brown on cotton yarn from Chromanil Brown R.)

RECIPE NO. 139.

Reddish Brown on Cotton Yarn.

Brown on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Direct Brown S D P.
(Sykes & Street, 85 Water St., New York.)

20 lbs. Carbonate of Soda.

20 lbs. Common Salt.

Enter in yarn at 110° F., bring up temperature to 205°, while turning, and turn one hour at that heat. Rinse and dry. For future or standing kettles use 40 per cent. less color, with 5 per cent. Carbonate of Soda and 10 per cent. Common Salt. (See Recipe 125, in which less dye is used for an old rose shade.)

RECIPE NO. 140.

Dark Blue on Worsted Yarn.

Blue on 100 lbs. worsted yarn.

Mordant for 1 1-2 hours at boil with

3 lbs. Bichromate of Potash.

2 lbs. Lactic Acid.

Rinse off and dye in separate bath with

10 lbs. Alizarine Blue S. C. R.
(Anchor Color Mfg. Co., 462 Cherry St., New York.)

2 lbs. Acetic Acid.

Enter in yarn at 110° F., bring to boil while turning, and turn one hour at that heat.

The above firm has two new grades of Alizarines, which they call Alizarine Blue S C R, and Alizarine Blue G B. The latter dyes a redder shade than the former. Both brands are fine and very concentrated dyes. The results which we show will speak for themselves, and a trial of either of these dyes will be all that is necessary, as they produce brilliant and full shades of colors at a reasonable cost.

RECIPE NO. 141.

Red on Worsted Yarn.

Anthracene Red B. on 100 lbs. worsted yarn.

Prepare dye bath with

2 lbs. Anthracene Red B.
(The Hanna-Schoellkopf Co., 135 No. Water St., Philadelphia.)

10 lbs. Glauber's Salt.

2¼ lbs. Acetic Acid.

Enter in yarn at 60° F., bring to boil while turning, and turn one hour at that heat.

On account of their fastness and quick way of dyeing in one dip, these colors should become popular. There is a large range of them, from which the dyer will be able to get any required shade. (See Recipes 77, 89, 90, 103 and 127 for yellow, blues, green and red, produced from other anthracene brands.)

RECIPE NO. 142.

Black on Cotton Yarn.

Black on 100 lbs. cotton yarn.

Prepare dye bath with

6 lbs. Oxydiamine Black B Z.
(Wm. J. Matheson & Co., Ltd., 178 Front St., New York.)

30 lbs. Glauber's Salt.

2 lbs. Soda.

Enter in yarn at boil, and turn one hour at that heat.

Oxydiamine Black B. Z. dyes a very full and deep shade of black. It is fast to washing and stands acid and light. In running kettle for standing bath, 5 per cent. Glauber's Salt and 1-2 per cent. soda may be used.

RECIPE NO. 143.

Dark Violet on Cotton Yarn.

Violet on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Fast Direct Violet R.
(C. Bischoff & Co., 87 Park Place, New York.)

20 lbs. Common Salt.

1 lb. Sal Soda.

Enter in yarn at boil, and turn one hour at that heat.

Fast Direct Violet R., like Fast Direct Red B., not only dyes cotton alone, but also dyes cotton and wool mixed goods equally as well, the shades being very fast. (See Recipe 105 for a red from Direct Red B.)

RECIPE NO. 144.

Brown on Cotton Yarn.

Brown on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Direct Fast Brown G G.

1 lb. Direct Deep Black R.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)

20 lbs. Common Salt.
1 lb. Sal Soda.

Enter in yarn at boil and turn one hour at that heat.

By varying the proportions of Direct Fast Brown G G and Direct Deep Black R, a great many shades of brown can be produced. The shades produced with these two anilines are very fast. (See Recipes 5, 6 and 99 for shades of browns from Direct Fast Brown G G, and Recipe 120 for a shade of dark blue from Direct Deep Black R in combination with Benzo Blue B X.)

New Dyes.

We desire to refer to Recipe 125, in our August number, as a misconception could possibly be had in the comments made by our dyer, refering to the use of Direct Brown S D P, in a standing bath, furnished by Sykes & Street, where 40 per cent. color is said to be required. What was meant is that 40 per cent. of the amount of color used in the first bath is required for the second and subsequent operations.

We use in Recipe 130, for the first time this year, Soudan Black No. 2, furnished by Sykes & Street, New York, for the production of a black on woolen yarn. This is a new acid black, and is very fast to light and milling, and is very highly spoken of in our foreign exchanges. It is especially recommended for piece dyeing, owing to its property of dyeing quite evenly and penetrating thick material. It stands finishing very well.

In Recipe 132 will be found an excellent combination of dyes (Direct Fast Brown B, Direct Deep Black R), furnished by Farbenfabriken of Elberfeld Co., New York. Both of these dyes have been used in former recipes, in combination with other dyes, with most satisfactory results.

In Recipe 133, Milling Red F R, furnished by William J. Matheson & Co., New York, for the production of a bright red on woolen yarn, is used. This dye is used in connection with five to ten per cent. of acetic acid, or four to six per cent. of bisulphate of soda. It is extremely fast to milling and washing, and does not tint white wool. Its fastness to light and steam is excellent. It is well adapted for printing woolen goods, as it does not run when steamed.

An excellent shade of blue on cotton yarn is seen in Recipe 136, produced by the use of Direct Blue B, in combination with Direct Black K, both furnished by A. Klipstein & Co., New York. Direct Blue B is intended for cotton only, and may be used in one operation, one to three per cent. being required, according to the shade wanted. The dye bath, if not exhausted, can be kept for future operations, with, of course, a less proportion of the dyestuff.

The Blue on Worsted Yarn, produced by the use of XLL. Blue, furnished by Read Holliday & Sons, New York, is seen in Recipe 137. This dye is easy of application, fast, and possesses many advantages for dyeing woolen goods. Its usefulness is suggested for dyeing suitings, etc.

In Recipe 138, Chromanil Brown G G, furnished by the New York & Boston Dyewood Co., is used for the production of a brown on cotton yarn. This dye is an unmixed product, and is used on cotton in the usual manner for substantive colors. The dye is easily soluble, yields even shades, and the dye baths are readily exhausted. As stated by our dyer in his comments, this dye yields full, yellowish browns, fast to washing and light, and does not bleed into the white. The dyeings from this dye are also fast to alkalies and acids, and not affected by hot pressing and calendering.

A dark blue on worsted yarn is seen in Recipe 140, produced by the use of Alizarine Blue S C R, furnished by the Anchor Color Mfg. Co., New York. This dye is a very fast color, and is what is termed of double strength, 20 per cent. strong, 10 per cent. of color

giving a deep, rich navy blue shade. It can be worked with logwood, fustic, indigo extract, etc., thus giving a variety of shades.

We have used a number of the Anthracene dyes, furnished by the Hanna-Schoellkopf Co., Philadelphia. We present a new one in this line in Recipe 141, known as Anthracene Red B, for the production of a red on worsted yarn.

We desire to call attention to a dye furnished by Wm. J. Matheson & Co., New York, known as Oxy-Diamine Black B Z, which has been well received by manufacturers that have used it, and resembles the dye known as Oxy-Diamine Black B G, furnished by the same house, the latter having been found of great value for dyeing linings.

A very attractive dark violet on cotton yarn is found in Recipe 143, produced by the use of Fast Direct Violet R, furnished by C. Bischoff & Co., New York. Dyers will do well to give this attention.

John J. Keller & Co., New York, furnish in Recipe 129, a dye called Acid Violet B B, for the production of a shade of violet on woolen yarn. This dye is particularly fast to alkalies, and belongs to the ordinary shades of acid blue violets, and gives a full and deep color.

Roundabout Notes.

A recent English patent describes a method of obtaining a quebracho extract easily soluble in cold water from the usual commercial extract. Three hundred pounds of common quebracho extract at 25° B. are mixed with 80 pounds of bisulphide of soda at 35° B. and heated in a closed vessel at from 130° to 145° C. for eight hours. The product gotten in this manner is perfectly soluble in cold water, which ordinary quebracho extracts are not, and is said to give a soft, pale pink-colored leather very similar to hides tanned with mimosa bark. It penetrates the pores of the hide quicker than the usual extract. The leather dyers should certainly make a note of this and try experiments with the product.

* * *

The Hoechst firm have been going ahead with improvements on processes connected with paranitraniline red. Within the last month or so they have sent out quite a number of documents illustrated with patterns. One of the most useful of these improved processes is a new and simple process of getting white and color discharges. They add stannous chloride to the discharge color and, on steaming, the red is reduced at once by the stannous chloride into soluble reduction products easily removed in the subsequent washing. The tendering of the fibre by the formation of hydro-cellulose is avoided by adding glycerine or a similar body.

* * *

A discharge color thickened in the ordinary manner and containing stannous chloride and, say glycerine, is printed over paranitraniline red, and after drying, the cloth is steamed for about ten minutes and passed through hot water. After being thoroughly washed, the printed cloth is next passed through a very weak and slightly acid solution of bleaching powder. This bath is not intended to act upon the white as might be thought, but to freshen up the red, which may possibly turn a little brown on steaming. In getting a color discharge any dyestuff of course which resists stannous chloride may be added to the white discharge or the cloth may be previously prepared with tannin and then printed with aniline dyestuffs mixed with the stannous chloride discharge. The white and color discharges act as resists for aniline black, which may be used as a cover.

* * *

A writer in the Faerber Zeitung, notes that the insoluble azo dyes have not been used in wool dyeing, because the

proportion of the material necessitates a strongly alkaline solution, and this has a hurtful action on the wool. He suggests that this difficulty can be got over in two ways. In the first method, the wool is dyed in a hydrochloric acid solution of paranitraniline, for instance, and after washing thoroughly well the diazotising is carried out. With para nitraniline the wool first dyes yellow, then turns to a dull brownish yellow on diazotising. It is then developed in a beta-naphthol solution and washed in a slightly acid bath. In the second method suggested, a diazo solution is first prepared and the wool is dyed in this, after which it is rinsed and developed in a beta-naphthol solution and washed in a weak acid bath as before. In this way very useful pink, red and brown shades can be obtained with paranitraniline, and pretty violet to blue shades with dianisidine, and these have all the usual fastness of shades developed on the fibre.

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Schlumberger has got some new metallic effects on cloth by means of aluminum powder. He notes that he can obtain this now in France, at from 7 to 8 francs the kilo., whereas when Deville was making his experiments it cost 1000 francs for the same quantity. The new effects are got on goffered materials, that is to say, cloth, leather or paper with patterns in relief. The stuff is treated on the pattern in relief only with a mixture of aluminum powder steeped in an ammoniacal solution of casein dissolved in water containing 10 per cent. of borax. The casein solution is made by taking 22 grammes of powdered casein, moistening it with 150 grammes of cold water, then adding from 6 to 8 c.c. of liquid ammonia. After solution of the casein from 10 to 12 grammes of powdered aluminum are steeped in it. For spreading this on the raised parts of the stuff he uses an elastic roller made with gelatine and glycerine something after the pattern of a printer's roller. This method has been put to fairly extended use already in Alsace.

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Sunder, in the journal of the Mulhouse Society, records a large number of experiments made with the object of ascertaining what addition will best preserve peroxide of hydrogen. He finds that alcohol and ether are the best things that can be used for the purpose, and of the two alcohol is evidently by far the better. In fact, 2 per cent. of alcohol having been added to peroxide of hydrogen, it lost less than 5 per cent. in strength after 12 days, and about 15 per cent. after 64 days. Sunder concludes that the best means of preserving peroxide is to add about 2 per cent. of alcohol to it and to keep it in a cool and dark place.

Printing and Mercerizing Cotton.

A citizen of the Republic of France has recently invented a chemical process for the production of white or colored crepe-like designs on cotton, linen, and other fabrics or yarns of vegetable origin. The invention is based on the recognition of the well known property possessed by concentrated caustic alkalies of contracting or shrinking vegetable materials. This property of these alkilies has been employed in various ways for manufacturing fabrics or yarns which are partially or wholly crimped or provided with crepe-like patterns or designs. One process for producing patterns of this kind of fabrics consists in first covering certain parts of the stuff (which is of vegetable origin) with a resist-paste and in then treating it with a concentrated alkaline solution, which has no action on the parts covered with the resist-paste. As resist-paste, a gummy or gelatinous mucilage of the fatty bodies or of combinations of the fatty bodies or a resinous solution, caoutchouc, guttapercha, or the like may be used. This resist-paste acts, therefore, simply in a mechanical manner by preventing the alkaline solution coming into contact with the parts of the fabric

which are covered by it. In another process it is stated that, instead or an alkaline solution, an acid bath (sulphuric acid) can be employed, and that the bath should have a temperature of about 0° Centigrade, in order to allow it to act for a considerable time on the fabric. The resist-paste is employed in the same manner as in the previous case. According to another process the fabric, before being treated with an alkaline solution, is printed with a coagulable substance such as albumen, casein, or a mixture of gum-water with chromium salts. These substances also act only in a mechanical manner—that is to say, they protect the printed portions of the fabric from contact with the alkaline solution, with which the fabric is afterward treated. The present invention differs essentially from these known processes in that the fabric is first treated with an alkaline solution and that the parts of the fabric which are to form part of the design are not protected against the action of the alkaline solution by a mechanically-acting protective material, but by a chemically-acting substance, such as acids or suitable salts or oxids.

This process is carried out in one operation—that is to say, the neutralizing substance is printed on the wet fabric, impregnated with the alkaline solution in such a manner that the alkaline solution is neutralized before the contractile action, which sets in after the lapse of a few seconds, has commenced at the parts which are to receive the impression.

The operation is something after the following fashion.

The fabric or yarn, which is raw, white or evenly mordanted, evenly dyed or previously printed, is placed on a machine for printing in several colors and is then impregnated by means of an engraved block cylinder, over its whole surface with a thickened or non-thickened 30° to 50° Baume solution of caustic soda, and is at the same time on the same machine printed in colors by means of one or several successive rollers on which the crepe-like effect to be produced is engraved, the color being, for instance, composed of one liter of water and six hundred grams of British gum or roasted starch with the addition of an acid or acids, such as acetic acid, tartaric acid, or hydrochloric acid, which partially or wholly neutralize the caustic soda and thereby prevent the action of the latter.

Instead of adding acids to the colors, suitable salts may be employed as the neutralizing material—such, for example, as aluminium sulfate, chlorid of magnesium, tin salt or stannous chlorid, perchlorid of iron, acetate of aluminium, acid chromates, acetate of chromium, lead nitrate, and the like—which by a double reaction partially or wholly neutralize the caustic soda and thereby prevent the action of the same on the parts of the fabric or yarn which are printed with the neutralizing liquid.

Certain oxids—such as aluminium hydrate, oxide of chromium, and oxide of lead—have the same action on the caustic solution as the acids.

After the impregnation by means of the blocks and the printing referred to the material is either dried or immersed directly in a water or acid bath without drying, so as to remove the caustic soda.

In this process, the fabric or yarn is treated so as to have a crepe like effect produced on it; but by modifications of the process new crepe-like effects in one or several colors can be produced.

Memoranda and Remarks Regarding Bleaching and Finishing.

BY AN ENGLISH BLEACHER.

Continued from August.

Tin Finish.—No. 47*s*, 36 inches, medium, 53 yds., 13 lbs. 5 oz., straight through No. 7 Mangle, 5 56. Stiffened on No. 5 Mangle, 4-56, lapping, etc., run through.

Mixture.

4	cans	Salt water
1	"	Clay
½	"	Mineral
½	"	" cal'd
1	"	Flour 18 T.
1	"	Grease, small

1½ " Soap
½ " Starch

No. 48, 36 inches, medium, 53 yds., 15 lbs. 2 ozs., in all respects as above with exception of 7-56 on No. 5 Mangle.

Tin Finish.—A., 36 inches, medium, twice round No. 7 Mangle, full weight. Stiffener No. 3 Mangle, 3-56, lapping, etc., run on boxes, wood and cotton.

Mixture.

2 cans Clay
2 " Mineral
1 " " cal'd
2 " Flour 18 T.
2 " Grease, small
2 " Soap
2 " Salt, dry
½ " Farina, small

Tin Finish.—For low goods, run through 6 bowl mangle and chased twice round face of cotton. Stiffened on cotton and wood.

Mixture.

½ can Flour 24 T.
6 lbs. Farina
1½ can Clay
½ " Mineral
4 " Water
1 " Salt
Blue Smalt

Tin Finish.—50 pieces 40 to 76 yds., 17 lbs., mangled on first time mangle, chased three times round, all weights on, cotton face, stiffened on two wood bowl.

Mixture.

¾ can Clay
¾ " Mineral
1 " Flour 24 T.
1 " Rice
5 " Water
1 " Softening
10 lbs. sub (Epsom salts)
Blue Smalt

Boiled to 160°. The above look very well and feel natural.

Tin Finish.—38 inches, 50 yds., 10 lbs. 8 ozs. First time mangle all nips, all weights on. Chased three times round second mangle, cotton face, top brass bowl hot, stiffen on cotton and wood no friction, 3-56.

Mixture.

½ can Flour 24 T.
½ " Rice 18 T.
12 lbs. Patent Starch } 1 can
12 " Farina } water
1 can Mineral
2½ " Clay
3 " Water
small 1 " Salts (sub)
1½ lbs. Grease
1½ " White Soap

Boiled to 170° F. The cloth looks very well when run face side to wood and water after drying.

Tin Finish.—Stouts.

Boil two cansful salt with six water, 13 lbs. farina in 1 1-2 water, mix well up 26 T., so that it comes up nice; starch, 1 1-2 mineral. If too thick add a little more water. Stiffened on 3 bowl mangle brass driver steam in. If the quality is lower, put 2 1-2 mineral.

Tin Finish.—34 in., 46 yds., 7 lbs. 8 ozs., twice round 6 bowl mangle with all the weights on. Stiffened on cotton and wood, 7 or 8 friction to the yard.

Mixture.

2 can Clay
1 " Mineral
1½ " Flour 22 T.
½ " Rice 18 T.
10 lbs. P. Starch } 1 can
1 can Water } water
6 lbs. Farina
10 " E. Salts
2 cans Water
(Boiled to 160° F.)
1 lb. Softening.

To be continued.

Editor Textile World:

We desire to say that we have had numerous inquiries about our Blue 77 G. and also our Acid Black 4 B., which appeared in your valuable journal in July and August, respectively. This is more than we can say of any other paper. ANCHOR COLOR MFG. CO.
New York.

—Wool may again come to be an important adjunct in sheep husbandry, but the best quality of mutton, produced at the greatest profit, will clearly become the rallying cry of the flock-masters in the United States.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Knitting Silk Fabrics.

Editor Textile World:

Will you please inform me what books there are that explain about knitting silk, from the time the silk is made by the cocoon, and the different processes through which it goes, to the manufactured fabric?

Massachusetts. G. W. L.

There is no book so comprehensive as to cover all of this. There is no work on knitting, that we know of, that will be of use to our correspondent. The best work on knitting, of any in the English language, is the one translated, in 1885, from the German, by Gustav Willkomm. Silk from the cocoon to the reel is an industry distinct from manufacturing. Information concerning this latter industry can be found in a pamphlet on "Silk Culture," by C. V. Riley, published by the Department of Agriculture. Valuable articles on silk culture experiments, covering the subject, can be found in the annual reports of the Department of Agriculture for 1888 and 1890, on pages 111 and 265 respectively. There is a book, good even now, published in 1831, entitled "Silk Manufacture," being a volume in Dr. Lardner's Cabinet-cyclopedia.

About Cotton.

Editor Textile World:

How close a division is there made in the trade between different grades of cotton? Is the length of staple considered when grade, alone, is referred to? I desire to buy some cotton stored in a cellar. Am I obliged to receive it at its present weight? In buying cotton, how much bagging and iron bands am I obliged to pay for?

New York. E. W. F.

The grades of cotton are divided into one-fourth grades, as full, fully, and barely. Fully means a one-quarter grade above full, and barely means a one-quarter grade below full. The staple is not considered in the grading of cotton, or its classification, but sand and dirt are taken into account, as well as gin-cuts. Regarding the latter, deductions can be made of one-fourth of a grade or more, according to the extent of the cutting. Cotton stored in cellars, or below the level of the street, is not regarded a good delivery until after the bales have been stored above the level of the street for a period of, at least, 30 days, which, of course, means less weight. One is not obliged to pay for more than six iron hoops, not exceeding in weight 12 pounds in the aggregate, and any excess of this, at the option of the buyer, must be deducted from the gross weight of the bale. All unnecessary bagging must be allowed for, if demanded.

Seed Cotton To The Factory.

Editor Textile World:

I am still agitating the central system of ginning cotton along side of the mill where it is spun into yarn. The managers of some of the leading railway systems entering this city, are viewing the proposition favorably. In fact, the matter is in such an advanced state that I am offered a contract at a low rate per ton, covering a term of six years. To my mind, the next thing to do is to enlist the spinners in the proposed plan, then build a ginnery and oil mill along side of the cotton mill, and supply the cotton to that mill without the cost and expense of baling; then duplicate this plant in Manchester, England, and begin diverting the export cotton trade from gulf ports to Boston, sending it direct to Manchester via the latter city, in the seed. This is a very easy thing to do, if one knows how to do it. I wish to form a syndicate of Boston capitalists for this purpose. Do you think it can be done? I am anxious to arrive at all the charges and expenses that a bale of cotton now has to bear. To this end, I desire information on the following points: Damage per bale from water and dirt; cost per bale of removing bagging and ties and picking cotton from same; value of bagging and ties after removal; cost of storage per bale at the cotton mill; cost of handling at the mill; insurance at the mill; brokerage; express on samples; average rate of freight per 100 lbs.; average loss by fraudulent bills of lading and dishonest buying agents; and cost of mixing in cotton mill.

St. Louis. C. H. Merry.

We regret exceedingly that we cannot take such a roseate view of the objects of our correspondent as he does himself. This subject is not wholly a new one, and conditions have never been, or are they now, in our opinion, favorable to carrying out such a scheme as here presented, practically. Briefly answering the points upon which our correspondent desires information, we will state that no separate record is kept of the money damage to a bale from water or dirt during transportation and handling of cotton from the factor to the mill. We would say, however, that the liability of damage to cotton in the bale was no greater, if as great, as it would be if shipped in the seed. Our correspondent does not suggest a method of shipment

for his seed cotton, whether loose in a box car, or put in bags. The cost per bale of removing bagging and ties and picking cotton from same is an item that mills do not make a separate account of, but goes into the general cost of labor attached to the picker room. The market price of bagging and ties, after removal, is about one-half cent per pound for the former, and about one-quarter cent per pound for the latter. The cost of storage of cotton is much less in the bale than it would be in a loose state, as in the case of cotton on the seed. The storage requirements for seed cotton would be greatly in excess of that required for baled cotton. The cost of handling, also, of seed cotton, or unpacked lint cotton, would be greatly in excess of that for baled cotton. As to the insurance, there is no rate with our local insurance companies of insurance on cotton on the seed. The minimum rate on cotton in the seed, in first class storehouses in Boston, is one per cent. on brick, and 1 1-4 per cent. on frame buildings. As to the brokerage, we do not see how any saving can be made in this item, as someone would receive a commission, or brokerage, no matter in what condition the cotton may be for handling. Express on samples is a small item, and is usually, though not always, paid by the mill buying the cotton. The freight per hundred pounds is more easily ascertained at St. Louis than in Boston. We feel confident, however, that the freight would be much greater in the case of seed cotton than compressed bale cotton. As to the average loss by fraudulent bills of lading and dishonest buying agents, there cannot be any difference whichever way the cotton is shipped. The loss in this particular is very small, anyway, and seldom occurs. The cost of mixing in the mill is not a separate item, but goes in with the general cost of labor in the picking room. We have answered in a somewhat general way, because it is impossible to furnish the information called for specifically, without giving much time and labor to it.

Catechued Ganging.

Editor Textile World:

Will you give me a recipe for coloring catechued ganging?

Connecticut. M. T. Co.

Our correspondent does not give us the shade that he desires to obtain. The following recipe may give him a foundation upon which to work, for a brown on 30 pounds cotton yarn:

Steep yarn all night in a boiling bath containing

4 lbs. Cutch.
½ lb. Blue Vitriol.
½ lb. Alum.
4 lbs. Extract Fustic Liquor, 51 deg.

Lift next morning and wring.

Finish with

1 lb. Chrome.

Enter yarn at 110 deg.; give 4 turns. Lift, wash and soften with

2 pails Softener.

Enter yarn at 100 deg.; give 2 turns, lift and wring.

In regard to the softener referred to, the following may be followed, which is intended for any harsh colors on cotton:

Boil in 50 gallons water

1 pail Palm Oil.
1 pail Sal Soda.

or enough of the latter to cut the oil. Boil both until well dissolved. This amount of softener is sufficient to soften 200 pounds cotton yarn, and two pails is enough for 30 pounds cotton yarn of the very harshest kind. By using this on yarn that has had chrome on it, it will make it soft and pliable. For some shades of brown, the alum is omitted, and for other shades extract of fustic is added. Sometimes copperas alone is used in connection with cutch, and chrome used in the finishing.

Fuller's Earth.

Editor Textile World:

A friend of mine has found a good deposit of Fuller's earth, apparently of excellent quality, and has asked me about a market. Can you favor me?

Pittsburg, Pa. J. N. G.

We have replied by mail.

Dempsey vs. Dobson.

Editor Textile World:

Will you tell me what the present status is of the well known suit of Dempsey vs. Dobson?

Massachusetts. X.

As we understand it, this case has been sent back from the Supreme Court of the State of Pennsylvania to the Court of Common Pleas for a new trial, and may be appealed again to the Supreme Court of that State. The decision of the Supreme Court of Philadelphia will be found on page 459, volume 34, Atlantic Reporter. The latter is published by the West Publishing Co., St. Paul, Minn. A copy of the Supreme Court decision can be obtained of this company for 25 cts.

Bleaching Linters.

Editor Textile World:

Will you tell me how to bleach cotton linters?

New York. F. F.

Peroxide of sodium will do it, and we would suggest that our correspondent write to the Roessler & Hasslacher Chemical Co., 100 William St., New York, who manufacture this material.

To Prevent Black Crocking.

Editor Textile World:

Will you kindly inform us how to make a wash for "fast" black fabrics, so the goods will not crock after being washed. We buy what is supposed to be a fast black, but the goods after coming from our wash, crock.

New York. K. K. Co.

It is difficult to advise how to remedy this trouble without knowing the full particulars as to how the yarn was dyed, the materials used, and manipulation. We learn from our correspondent in a subsequent communication that the black in question was obtained with Alizarine and an acid color. The color, we understand, is not a logwood dye. As the yarn is colored with alizarine, as well as with an acid color, we will suggest that the yarn be passed through a bath of chrome, by which we mean a luke-warm or hot bath, containing a solution of, say, one to three pounds bichromate of potash. By this method the color should be cleared, and the loose particles better fastened to the fibre.

Flax Straw.

Editor Textile World:

We have a good deal of flax straw in this locality, and we would like the address of mills that work it up. Can you give us the necessary information?

Missouri. B. & McD.

The following mills use flax, both hackled and rough: Parbour Flax Spinning Co., Paterson, N. J.; Marshall & Co., Kearney, N. J.; Smith & Dove Mfg. Co., Andover, Mass.; Finlayson, Bousfield & Co., Grafton, Mass.; A. H. Hart Co., New York City; Cable Flax Mills, Schaghticoke, N. Y.; James Thompson & Co., Valley Falls, N. Y.; Whitney, McDuff & Co., Millbury, Mass.; Worcester Thread Co., Worcester, Mass.; Dunbarton Flax Spinning Co., Greenwich, N. Y.; and the Stevens Linen Works, Webster, Mass.

We would also suggest to our correspondent that he write to James Elmslie, 218 Church St., New York. He handles a great deal of flax, hemp, jute, etc., and is well informed in matters of this kind.

Paris Exposition.

Editor Textile World:

What action has Congress taken in regard to the Paris Exposition of 1900?

Connecticut. T. W. A.

Congress, at its last session, passed an act, which was approved July 19, 1897, authorizing the acceptance of the invitation of the Republic of France to take part in the International Exposition in Paris, in 1900. In accordance therewith, the president has appointed Major Moses P. Handy, of Chicago, as a special commissioner to represent the United States in the proposed exposition. Major Handy left for Paris the latter part of August.

Books on Worsted Manufacture.

Editor Textile World:

Can you recommend some books for one that is trying to learn the worsted manufacturing industry, those that will be helpful?

Connecticut. A. G.

The following books are new and up-to-date. We have no hesitation in recommending them: "Practical Weaving and Cloth Dissecting," by T. R. Ashenhurst; "Spinning Woolen and Worsted," by W. S. B. McLaren; "Textile Calculations and Structure of Fabrics," by T. R. Ashenhurst; "Wool Manufacture," by R. Beaumont; "The Mechanism of Weaving," by T. W. Fox; "Jacquard Weaving and Designing," by T. F. Bell.

New Publications.

USEFUL TABLES FOR WOOLEN MANUFACTURERS. Philadelphia: Harold R. Zelete, 32 S. Third St. This little work of 62 pages has just been published, of a convenient size for the pocket. The tables are intended for hasty reference, and embrace such as relate to wool shrinkages, counts of yarn, and other matter of like import that manufacturers have occasion to refer to frequently.

THE SELF-PROVING ACCOUNTING SYSTEM. New York: Self-proving Account-Book Co. Price $5.00. This is a manual for accountants and auditors, prepared by A. O. Kittredge and J. F. Brown. The former is well known as an expert accountant. The book has upwards of 300 pages, with four fac-simile insets of books, and nearly 100 other illustrations. It is a large octavo, bound in cloth. This book describes and illustrates a system of accounts adapted to various lines of business, which have for their foundation a perpetual balance sheet. It is at once a double entry system, and more than a double entry system, by reason of the methods employed for summarizing and condensing. The ledgers used are so constructed as to be readily sectionalized for purposes of proof.

THE STANDARD MACHINE CO., 508 Minor St., Philadelphia, manufacturers of the Standard Automatic Knitting Machine, have just issued a catalogue relating to their products. The value of automatic machines demonstrates itself when it is embodied in a first class machine like that made by this company. The Standard "B" Automatic Knitting Machine is well known in the trade as a full automatic hosiery knitting machine, capable of running 250, or more, revolutions per minute on the leg, and 125 revolutions and over on the heel. It makes either ladies' or half-hose on the same machine. With the catalogue, a separate card is sent, showing the schedule tariff on hosiery, conveniently arranged to hang up in the office.

WILLIAM J. MATHESON & CO., LTD., 178 Front St., New York, has just issued their bulletin No. 61, showing results ob-

tained by the use of Scarlet FR.; FRR.; and FRRR., manufactured by Leopold Cassella & Co. These are new colors resembling this concern's well known brilliant scarlets in their properties but possess much greater fastness to stoving and washing. They are well adapted for the dyeing of skeins and pieces, especially flannels and felts.

THEORY OF SILK WEAVING. By Arnold Wolfensberger. New York: 31 East 12th St., Paul Wenzel. This work is just off the press, treating of the construction and application of weaves and the analysis and calculation of silk fabrics. It contains 95 plates in color. The author is a graduate of the Textile Institute at Zurich, Switzerland. The book is issued in full recognition of the fact that very little has been done in this country for technical education in the silk industry. And it was this circumstance, as well as the absence of technical literature on this special branch, that prompted the author to offer in the present treatise the theory of shaft weaving, applicable to silk. The work is divided into three principal parts: Drawing-in the warp in the harness; the weaves and their application; decomposition or analysis of the cloth. The subject, though condensed, is made clear and comprehensible to those desirous of increasing their knowledge in this direction.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J. This company has just issued a pamphlet relating to the merits of lead paints and Dixon's Silica Graphite paints, compared. The object of this pamphlet is to show the merits of the latter paint as a protective covering for iron structural work, and to sustain the growing opinion, among those who have given the matter careful consideration as to the use of some form of carbon, in combination with red lead, or alone. The pamphlet is largely in answer to the claims of red lead manufacturers condemning the use of carbon, especially graphite. The pamphlet contains much valuable and interesting matter that the public and manufacturers should be familiar with.

CYCLONE FANS AND HEATER COILS This is the title of a pamphlet recently issued by the Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia, to show the advantages and merits of their fans and heating coils for ventilating, drying and heating purposes. The purpose of this pamphlet, or catalogue, is to set forth the various forms of fans and heating coils best adapted to meet the requirements of manufacturers for ventilating, drying and dyeing. A fan or coil, in one form or another, enter into the construction of all the heaters, whether for wool, cotton, yarn, underwear or stockings, made by this company. The catalogue is very handsomely gotten up, with much matter of value to manufacturers.

CASSIER'S MAGAZINE—MARINE NUMBER. New York: The Cassier's Magazine Co. Price 50 c. This is an extremely interesting number of this magazine, with 560 pages of valuable matter to marine boiler furnaces; Hydraulic Principles Affecting a Floating Ship; Fast Torpedo Boats; Steamers for Shallow Rivers; The Design and Building of a Steamship; The Modern Marine Engine. Also valuable articles appear in this number written by experts, on the following subjects, etc.: Specialties of Warship Design; The Problem of Steamship Design; The Launching of a Ship; The Naval Weakness of Great Britian.

TRANSACTIONS OF THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION, April 28-29, 1897. The publication of these transactions has just appeared in a handsome volume of 353 pages, prepared by C. J. H. Woodbury, secretary, 178 Devonshire St., Boston. These transactions cover the papers and discussions thereon that were presented at the April annual meeting of the association. They are all exceedingly valuable, and touch upon the following subjects, among others: Cotton Transportation; The Cylindrical Bale; Manufacture and Use of Spinning Rings, and the Ring Traveller; Electricity for Mill Purposes; Recent Advances in Weaving; Weaving as a Fine Art; Picking and Carding.

A DESCRIPTIVE CATALOGUE OF USEFUL FIBER PLANTS IN THE WORLD. By Charles Richards Dodge. Department of Agriculture. Washington. 362 pages, 13 plates and 103 text illustrations. This is report No. 9 of the Fibre Investigation Division, under the charge of Mr. Dodge. It is a descriptive catalogue of the useful fiber plants of the world, including structural and economic classifications of fibers. Mr. Dodge is recognized as the best authority in this country upon fiber plants. This is an invaluable work and the only one that exists that covers the subject so completely. The catalogue treats of the ancient uses of fibers; the principal fibers used commercially in the United States and their imports; the classification of fibers based on uses and structure, forming a complete descriptive catalogue of the fibers of the world. We cannot speak too highly of the merits of the work. We hope to speak more extendedly elsewhere in this magazine concerning the merits of the catalogue at a subsequent time.

COLOR CARD for Read Holliday & Sons, Ltd., 100 William St., New York. We have just received a color card containing twelve samples of colored worsted yarn, in which some of the new dyes of this house are shown. We would suggest to dyers writing for it.

BULLETIN OF THE BUREAU OF AMERICAN REPUBLICS, for August, 1897. The second number of volume V. of the monthly bulletins of this Bureau has just been received, with contents covering the following subjects: Trade Relations in America; Railway Concessions in Bolivia; Arbitration Treaty with France; Message of President of Sao Paulo, Brazil; Monopoly of Manufacture and Sale of Matches; Colombian India Rubber Exploration Company, Colombia; New Mining Tax in Mexico; Tobacco Monopoly Re-established, and price of Public Lands in Nicaragua; Venezuelan Immigration and Colonization Agency in the United States.

—Massachusetts, Cherry Valley. Facts concerning the Chapel Mills Mfg. Co., are as follows: capital stock $23,000 paid in; Henry J. Brouard, president; Channing Smith, treasurer and manager; Charles Pigelow is superintendent. The selling agents are Converse, Stanton, and Cullen of Boston and New York. They will make ladies' dress goods and flannels. This mill contains 34 looms, has two sets of cards and a dyehouse. The estate was bought by Channing Smith, proprietor of the Valley Mills and this new company formed, in which Mr. Smith took $17,000 stock. The mills started up in full July 28.

Industrial News.

—It may be of interest to many of our readers to know that the Bureau of American Republics, Washington, D. C., has, in an advanced stage of preparation, a Commercial Directory of the American Republics and the European dependencies of Central and South America and the West Indies. The volume will be a handsome quarto, nine by twelve inches, of more than twelve hundred pages and will embrace, in its contents, the following information: Reliable descriptive, geographical, industrial, commercial and statistical data, and map of each country; the addresses and lines of business of the commercial houses of Latin America and the Hawaiian Island; the names of five thousand or more representative manufacturers, merchants, shippers and bankers of the United States, interested in foreign trade, classified under proper headings; the names of the commercial and trade organizations, associations and unions of the countries embraced in the International Union of American Republics; valuable data of transportation companies and trade routes by land and water; railway, telegraph and cable facilities and particulars as to shipping, port regulations, tariffs customs laws, and patent, trade-mark and copyright laws, and commercial licenses, passports and postal regulations.

—The American Spinners' Cotton Yarn Exchange, Arnold B. Sanford, manufacturers' agent, 226 Devonshire St., Boston, reports that the exchange idea has excited a great deal of interest among manufacturers and consumers, resulting in good business indications for fall. Mr. Sanford understands the requirements of buyers, and knows where their orders can be placed with satisfaction.

—Among the improvements during the Cohoes Canal Co.'s shut down is a new flume which is being built from the Riverside mill wheel pit to their water power from the canal. The Cohoes Co. has rearched one of its tunnels, and also constructed a portion of a new retaining wall.

—The Royal Mill, Cohoes, has orders enough to run until 9 o'clock at night into November, and they are now refusing orders.

—The Farnsworth Card Clothing Co., Pittsfield, Mass., is having a good demand for its product, and within a comparatively short time it is the intention of the company to add more machines to those already in operation. This company starts at a most favorable time, and Farnsworth's experience and thorough knowledge of his business insures a good line of goods, and the satisfaction of his customers.

—The Parks & Woolson Machine Co., Springfield, Vt., have placed the following orders: one of their combination napper and gigs, with the Raritan Mills, Raritan, N. J., making two of these machines purchased in six months; one of their two-cylindered gigs, with the Algonquin Co., Passaic, N. J., making four purchased by this company.

—The American Machine Company have just completed large extensions to their works. They have taken advantage of the quiet state of trade and have gone through all their different departments improving and adding, so as to be in a position to meet the demands of their clients when good trade returns, which it soon will do. Notwithstanding the quiet trade which has existed for several months, they have several large contracts, amongst which we may mention: cards, drawing and speeders for the Shove Mills, Fall River; picking, cards and drawing for the Union Mills of Fall River. They have just completed the erection of 84 cards, all the picking machinery and drawing for the Mount Vernon Mills, Baltimore; 50 cards at the Clark Thread Co., Newark, and have now a repeat order in hand for this concern. Cards, drawing and speeders for the Pee Dee Mfg. Co., of Rockingham, N. C.; speeders at the Roberdel Mfg. Co., Rockingham; speeders at the New York Mills, New York, and several smaller contracts. This company has recently brought out a large number of improvements, amongst which we may mention their grinding motion for grinding flats from the working seating. This motion is one of the simplest on the market to-day, and the results obtained are perfect. The accuracy which is insisted upon and obtained throughout all the details connected with the several operations in turning out a complete machine, is in part obtained by the high class tools installed throughout their plant. All these tools have been specially made for them. Cotton manufacturers are specially invited to visit this shop, which is in Pawtucket, R. I., and is situated but a few minutes ride from the depot.

—The mills on the Pacific Coast that make blankets are running night and day to keep up their orders for shipment to the Klondyke mining districts. The opening of this new mining country has proved a boom to all kinds of manufacturers here.

—Ex-representative William Carter, of the firm of W. Carter & Co., a large knit-goods manufacturing concern, has just returned from a European trip, during which he has visited the principal points of interest in England, Germany, France and Holland. Doubtless he has picked up some new wrinkles in the trade, that will tend to keep up the reputation of this old established firm for up-to-date work. The firm have lately added the manufacture of rubber goods to their already extensive line.

—We desire to call attention to the advertisement, on page 126, of J. Stewart Walker & Co., who offer the Liberty Woolen Mills, Bedford City, Bedford Co., Va., at auction sale, to take place next month. The mill is said to be fully equipped with modern machinery and appliances, which have been used only for a short time. The plant is represented as being in good order, with capacity for the manufacture of high grade cloth. The mill cost $37,000, and is in the neighborhood of cheap coal, wood, and labor, with low taxes and freight rates. The town in which it is located is one of about 3500 inhabitants, on the main line of the Norfolk and Western Railway. It has churches and schools of all leading denominations, and good machine shops, where all kinds of repairing can be done. It has a fine system of water works and an electric light plant. The property comprises about 1¼ acres of land, with brick buildings. A full description of the property can be obtained by addressing J. S. Walker & Co., Lynchburg, Va.

—The Parks & Woolson Machine Co., Springfield, Vt., have just placed the following orders: J. R. Keine & Co., Philadelphia, one 72-inch worsted polishing machine, and one 72-inch two-cylindered sanding machine; the South Bend Woolen Co., South Bend, Ind., one double shear with list saving rests; the Victoria Plush Mills, Swathmore, Pa., one double shear; the Rosamond Woolen Co., Almonte, Ont., a measuring, doubling and rolling machine; Charles Streiz & Bro., 88 Walker St., New York, one doubling and rolling machine.

—Queen Dyeing Co., Providence, R. I., have just completed the erection of the Green economizer. The order was placed with the Fuel Economizer Co., of Matteawan, N. Y., who are the sole makers in the United States.

—Charles Fletcher has contracted for the Green economizer to be applied to the Babcock & Wilcox boilers at his new mill being built at Thornton, R. I. The order for economizer was placed with H. G. Brinckerhoff, the well known and popular agent who has for several years been in charge of their New England department, at 53 State St., Boston.

—The Clark Co., of Newark, N. J., have placed a repeat order for revolving flat cards with the Howard & Bullough American Machine Co., Pawtucket.

—The New England Cotton Manufacturer's Association will hold its 63rd Meeting at Philadelphia, on Wednesday and Thursday, October 27-28. The sessions will be held in the auditorium of the Philadelphia Textile School, corner South Broad and Pine Streets, excepting one session, on the evening of October 28, which will be held in the hall of the Philadelphia Museums, 233 South Fourth Street. Detailed arrangements of the meeting are in the hands of a local committee of citizens and will not be concluded until shortly before the meeting. The headquarters of the association will be at Hotel Walton, on South Broad St., but there are also numerous excellent hotels in the vicinity.

Lowell Textile School.

Rapid progress is being made in the equipment of the additional departments which are to be added to the Lowell Textile School, Lowell Mass., before the opening of the fall term on October 4th. Almost all the chemical benches and dyeing tables are now placed in position in the chemistry department, and other apparatus for the use of the students is beginning to arrive. In the cotton department, the latest addition is a new cotton comber and sliver lap machine, from the Mason Machine Works, Taunton, Mass., which have arrived this week. The woolen machinery, built by Davis & Furber, has been started up, and is working very satisfactorily, and the next machinery to be placed in connection with this department will be the complete worsted carding, combing and spinning plant. Much of the success in equipping the new department is due to the pains-taking care and attention devoted to them by the chairman of the Equipment Committee, Agent Lyon, of the Lowell Manufacturing Co., and the chairman of the Dyeing Committee, Thomas Walsh, of the Hamilton Print Works. Applications for admission to the school are being rapidly received, and a very successful fall term is anticipated. An additional prospectus to the Chemistry and Dyeing Class has been prepared, and may be had, together with the complete catalogue of the school's work, on application to the director of the school.

Antoinette Muhlhauser.

The treasurer of the F. Muhlhauser Co., Cleveland, Ohio, is a woman, Mrs. Antoinette Muhlhauser, who handles checks, overlooks the stock and makes purchases for the largest shoddy manufacturing concern in the world, having a capacity of 10,000,000 pounds per annum, with branch offices in Boston, Troy and Philadelphia. Mrs. Muhlhauser recently visited New York and registered at the Merchants' Association. It appears that an enterprising representative of the New York Journal called upon her and obtained a most interesting interview, in which she talked unreservedly of the advantages of the new tariff and the undoubted boom that will follow in all branches of trade. Mrs. Muhlhauser is described as being a large, fine looking German woman, of the brunette type. Her movements indicate a woman of great energy and decision. "At the death of my husband in 1894," she is reported as saying, "I incorporated the business for $600,000 and now have a trade that touches every country in the world. It amounts to hundreds of thousands of dollars, with a salary list of over $150,000, and enough orders now to keep our working force going for months to come. Our business gives employment to over 600 hands, working day and night for ten months in the year. Our employees are pretty evenly divided—about 300 women and 300 men.

"How do I think they compare in a business way? Well, most favorably to our sex. The women, as a rule, are more conscientious; they work harder—indeed, they are inclined to overwork, and so exhaust themselves. That was my trouble at first, but now I have my work systematized. I find I can do more and I expend less energy."

Mrs. Muhlhauser's account of how she spends the day is interesting. Not content with being treasurer of one of the largest manufactories in America, she also runs a farm—a practical farm of 193 acres, that yields an income from the sale of grapes, potatoes and cattle. Added to all this, Mrs. Muhlhauser has brought up a family of eight children, of whom the eldest, now manager of the manufactory, is twenty-eight, and the youngest nine.

"Every morning," said Mrs. Muhlhauser, "I make it a rule to be at the manufactory between 8 and 9 o'clock.. I attend to my business there until noon. No money transaction takes place without my advice and consent. I am not treasurer in name, but in reality. At noon I go to my city house, dine and rest until 2. Then I spend a few hours in the centre of town, doing whatever banking is necessary and making such purchases as are needed on the farm. As early in the afternoon as possible I turn up there, listen to my superintendent's report, consult with him about what is best to do and wander about the 193 acres as far as my time will permit. After that I feel that I have earned the right to a night's rest, and, if I wish, an evening's entertainment."

Until after her husband's death in 1894, Mrs. Muhlhauser had not been obliged to become a buyer. "However," she said, "I was always really a consulting partner

and understood the business perfectly, so that at my husband's death I was able to take such command as my son could not. Two heads are better than one," she added. "As for my sex I have found it in most cases an advantage. I have been treated with greater consideration, and have had greater advantages on account of it. The women I have met in trade seemed to me happier than those leading what is known as a life of luxury."

Keystone Knitting Machine Manufacturing Company.

A recent change has been made in the list of officers of the Keystone Knitting Machine Manufacturing Company, 1711 Randolph St., Philadelphia, in the election of W. R. Dillmore, as president, in place of Thomas A. Pearce, who has no further connection with this company. Mr. Dillmore has been the vice president and sole selling agent of this company during the past ten years. John C. Egly remains as secretary and treasurer. Their advertisement will be found among our advertising pages. Within the last two years this company has become one of the largest manufacturing concerns of latch needles in this country, having been successful in this line far beyond anticipation. Their spring bottom latch needle has made the Keystone knitter famous, and is adapted for use in every make of seamless knitting machines. As general agents for Brinton & Company's ribbers, they have introduced to the best trade in this country, a machine that is looked upon as one of the simplest and the best, from a knitter's and a mechanical standpoint, ever made. Especially valuable about this machine are the double-knee and high-spliced heel attachments, which are said to be in use in every knitting mill in Philadelphia. This, of itself, is a sufficient guarantee of the merits of the machine. This company are also makers of hosiery boards, winders, presses, etc. The long experience of this company, as manufacturers of knit goods, enables them to assist and advise those who are about going into the knitting business, and it might be well for those who contemplate taking up the manufacture of knitted fabrics to correspond with them.

The Poetic "Provinces."

The popularity of "the Provinces" is constantly on the increase, and interest in them on the part of intending tourists is by no means confined to the east. Indeed, many people are nowadays journeying from the central and far western portions of the United States to Nova Scotia, New Brunswick and Prince Edward Island, there to find sweet relief from the heat and monotony of the interior, as well as to revel in condition of social life, climate and scenery entirely different from those they have been accustomed to.

Even in the case of New Englanders—thousands of whom make their summer headquarters in the Maritime Provinces—the change in these respects is a marked one, and largely explains the popularity of this favored part of the continent with our own people. There is a potent attraction about this delightfully cool invigorating and romantic region, especially in that part of it known as " the land of Evangeline," that invariably makes one visit to it the precursor of dozens more.

September is one of the best months in which to make a trip to the provinces. The season is a trifle later than in New England, and the rock girt British possessions are then in the height of their climate glory. A tour by rail to St. John, varied, perhaps, by side trips up the St. John River, across the Bay of Fundy to Digby, the Annapolis Valley, the "Evangeline" country, Halifax, and, if possible, to Cape Breton and Prince Edward Island—this trip, or any part of it, will prove a most delightful and instructive vacation experience to any sincere lover of out-door life.

The expenditure of a two-cent postage stamp is all that is necessary in order to possess one's self of any desired information respecting these provincial tours, their cost, duration, etc. The passenger department of the Boston & Maine Railroad, Union Station, Boston, will make prompt and full reply to any such inquiries; and it is scarcely necessary to add that the facilities for "getting there" offered this season by the Boston & Maine, represent the acme of comfort and celerity.

Adirondacks.

During September a series of Physicians' excursions will be run over the Fitchburg Railroad to the Adirondacks, and no one not familiar with the beauties of that region should lose the opportunity of touring it at this time. The excursion will leave Boston, September 21st. All the best section will be included in the tours, and the service will be first-class in every respect. The Adirondacks combine all the picturesque features of Maine, New Hampshire and Vermont, in one grand panorama of mountain, lake and river, and the atmosphere is one constant exhilarating tonic. Physicians cannot afford to lose this opportunity, for these trips are educators, and with that idea in mind, both the hotels and railroads have arranged to perform the service at actual cost and to give the best they have. The rates will be $55.00 and $40.00, according to tour selected, which includes all expenses. While designated "Physicians' Excursions," it should be understood that they are not restricted to that class, but are open to all who may desire to avail themselves of the cheapest and best Adirondack trip ever advertised. For itinerary and information covering trip, application should be made to Dr. C. McV. Tobey, Manager Adirondack Bureau of Information, 220 Devonshire St., Boston, Mass.

—On page 125, will be found the advertisement of Riggs & Co., Philadelphia, who are well known as business and financial brokers, having established an enviable reputation for the honorable and efficient manner in which they transact their business in disposing of all kinds of legitimate business, negotiating partnerships, procuring special capital, etc. This concern has been established since 1872, and has had dealings in all parts of the United States and Canada; and from all that we hear of it, it is most deserving of support.

—*Massachusetts, Millbury. The Lapham Worsted Mill at this place was sold at auction Aug. 26, to E. F. Lane of Swanzey, for $14,000 above the mortgage of $23,000. The building is of brick, 2½ stories high, 147 x 53 feet. It is fully equipped with modern machinery for the manufacture of worsteds. The sale was made in order that the interests of Messrs. Lane & Batchelder be protected.

MILL NEWS.

Cotton.

New Mills.

—*Connecticut, Taftville. The Ponemah Co., denies that their new addition is to be used as a bleachery. The addition will be five stories, stone, a very large building. They have recently purchased a large amount of new carding and combing machinery of English make.

—*Georgia, Douglasville. Work is now being rapidly pushed on the new cotton mill in which Col. J. S. James and others are interested. The main building will be 150 x 430, two stories high and basement. Boiler and picker rooms will be separate. The plant is designed to have capacity of about 15,000 spindles. By the terms of the contract, buildings are to be completed by the 1st of January.

—Georgia, Dublin. A cotton mill is proposed for this place Capt. R. C. Henry, identified with the best interests of the town, is prime mover, and it is expected that definite steps will soon be taken.

*Maryland, Havre de Grace. M. Gambrill & Co.'s new mill is being started up and a number of the looms are already in operation.

—*North Carolina, Concord. We have a report direct from the Coleman Mfg. Co. that the foundation for its new mill was started about Sept. 1, and that they expect to commence operations next summer, employing 100 hands. The mill will be equipped with 3000 spindles, 100 looms, steam power. R. B. Fitzgerald, president, W. C. Coleman, treasurer. They are now raising capital. Complete outfit will be required, and is not yet contracted for, including steam plant, shafting, pulleys, automatic sprinklers, cotton machinery, looms, etc.

—Pennsylvania, Scottdale. Subscriptions for the new cooperative mill have reached $72,000, and it is stated that the balance of $28,000 needed can be had at any time. The committee will probably meet within a few days, to complete the organization of the company. A site in North Scottdale has been offered.

—*Rhode Island, Westerly. William Whittam, Jr., one of the incorporators of the Caledonian Textile Co., and the leading spirit in its organization, has recently returned from England, where he went to interest capital and make other investigations in connection with the company. We understand that he has had good success, and that it looks now as if the project would be carried through, and work on the building commenced before long.

—*Tennessee, Pulaski. Recently we reported that B. F. McGrew would start a sash, cord and bag factory. Later Mr. McGrew wrote that he had postponed the matter until business had improved. He is now going ahead with his project, and expects to be ready to start about the middle of October.

Enlargements and Improvements.

—Alabama, Tuscaloosa. The J. Snow Hardware Co., which operates a cotton mill here, is adding 80 new looms, and making other improvements to the extent of $10,000. The mill has been shut down during these repairs.

—*Connecticut, Putnam. Work has begun on the new addition to the plant of the Putnam Mfg. Co., of which we reported the original particulars Aug. 2. The building will be 250 x 96.

—Georgia, Rome. In consequence of having obtained a heavy government contract for heavy duck for mail sacks, the Rome Cotton Factory will add considerable new machinery. The order will keep them busy for nearly a year.

—South Carolina, Yorkville. The Yorkville Cotton Mills, which started up in May, are running night and day, and have such a good prospect ahead that it is likely the capacity of the plant will be increased very largely. Col. John R. Ashe is treasurer and buyer. Their equipment is at present 3000 spindles and 16,000 twisters. They are making singles and ply yarn.

—*South Carolina, Union. The Union Cotton Mills, whom we reported last week as adding 26,000 spindles and 800 looms, inform us that they are to add 30,000 spindles and 900 looms, making their total capacity 85,240 spindles and 2300 looms.

Mills Starting Up.

—Georgia, Atlanta. The Fulton Bag & Cotton Mills have settled the strike with their employees. They have discharged the negro women, and made some transfers that the white operatives asked for. The question is a race issue, and the victory of the operatives indicates that it is unlikely that further attempts will be made at present to employ negros as skilled help, together with white operatives.

—Massachusetts, Fall River. The mills of the Fall River Iron Works, the largest concern in the city, resumed operations Aug. 23, after a shut down of five weeks. The plant employs 2700 operatives. All the mills here are now running.

—Massachusetts, Worcester. The Saundersville, Whitinsville, Linwood and North Uxbridge Cotton Mills, which have been running 40 hours a week since May 1, went on full time Aug. 23. These mills employed a total of 1000 hands.

Woolen.

New Mills.

—*New York, Newburgh. Concerning Crabtree & Patchett's new mill, we learn that it will make worsted yarns, in low and medium counts, 40s and heavier.

—*Pennsylvania, Curwensville. The new weave shop built by W. A. Murr has be-

gun operations. Horse blankets, rag and yarn filling carpets will be made. He will buy his yarn. There will be 10 looms, operated by steam power. No dye house. Mr. Murr expects to enlarge by January, 1898.

—*Rhode Island, Nasonville. The Nasonville Mill which is being rebuilt, will be 300 feet long by 40 wide. It will be run by water power. There will be a dye house.

—*Rhode Island, Thornton. The two new Fletcher mills at Thornton are approaching completion. One will be used for carding and combing, and the other for worsted spinning. Machinery is now being installed in combing mill, and the steam plant is being set up.

—Tennesee, Jackson. It is probable that the Jackson Woolen Mills, which were burned a short time ago, will be rebuilt. The larger portion of the property is owned by the estate of Howell E. Jackson, and Mr. Jackson, Jr. is understood to be in favor of rebuilding, and believes that his mother will take the same view. The balance of the stock is principally owned by D. T. Cantrell, who has been manager, and who is anxious that the mills should be rebuilt, and equipped with up to date machinery. The insurance did not nearly cover the loss, but they were doing a profitable business, and had many orders ahead.

Enlargements and Improvements.

—Massachusetts, Plymouth. The Standish Worsted Mills have ordered 50 new looms from the Crompton-Knowles Loom Works, and will build a new weave shed to accomodate them. This is a very large increase in their capacity, as they formerly operated 22 looms. The concern has been very busy and has many orders ahead.

—New Hampshire, Enfield. The George Whitney Woolen Co. is making extensive repairs, and among other things, building a new storehouse. This concern has been busy all through the dull times, last year building a new yarn mill, and early in the spring a new office building, and addition addition to their main mill.

—Ontario, Breslau. G. A. Burres has purchased the shoddy mill property, and will re-fit it as a carpet weave shop, giving employment to 10 to 15 hands.

Oregon, Oregon City. Contract for building the dye house, picker house and machine shop of the Oregon City Mfg. Co., to replace those recently burned, has been let to G. R. H. Miller and T. S. Lawrence of Oregon City. The structure will be 109 x 113 feet, 2 stories with basement, and will have about 3000 square feet more floor space than the old, and the company expects to put in machinery sometime in September.

—*Rhode Island, Woonsocket. The addition to the Woonsocket Worsted Co.'s plant will consist of a new storehouse 45 x 50., two sets of worsted cards have been put in, making a total of eight sets.

Mills Starting Up.

—Maine, Skowhegan. The Coburn Woolen Mills have put on a night force, and are now running night and day.

—Massachusetts, Cherry Valley. A new corporation to be known as the Chapel Mills Mfg. Co. has been organized, with capital stock of $23,000 to operate the Chapel mill, formerly a part of Newton Darling's estate, and recently sold to C. S. Smith.

—Massachusetts, Fall River. The mill of the Jesse Eddy Manufacturing Co., which has been closed since April, has started up, giving employment to about 300 hands. This is a twelve-set mill.

Knit.

New Mills.

—*Delaware, Smyrna. The Smyrna Shirt & Hosiery Factory, will make men's shirts and misses' and children's ribbed hosiery giving employment to about 100 persons. There will be 55 new knitting machines, 66 sewing machines. The factory is 60 x 240. Clarence Prettyman and Edwin Prettyman are the proprietors. There will be no dyehouse for the present.

—*Georgia, Athens. In our June issue we stated that James H. Dootson was contemplating starting an underwear mill. This project has materialized, and a new company has been organized, with capital stock of $15,000. Mr. Dootson is president of the Athens Knitting Mill, which manufactures hosiery, and which has been very successful. The two mills will not compete in any way. Most of the machinery has been purchased, and will soon be shipped.

—*Michigan, Grand Rapids. The new knitting mill mentioned here will be known as the Globe Knitting Works. They expect to begin operation this month. They manufacture men's, women's and children's ribbed underwear. They will operate 8 machines to start with, use electric power, and buy their yarn.

—*New Hampshire, Franklin Falls. Work is progressing rapidly on the new hosiery mill. Messrs. Sulloway, Morrison and Mayo, who have been in Europe for machinery, have returned.

—*Pennsylvania, Lehighton. The deal which has been on foot between Mackie & Co. and the Board of Trade, for the location of an underwear plant, has been finally closed, and they have taken a five years' lease of premises, and agree to employ 75 hands. The town raised upwards of $16,000, and will also pay the expenses of removal of the plant here.

—*Pennsylvania, Norristown. Plans for Rambo & Regar's new Globe Knitting Mill have been finished by Messrs. Hallies & Ballinger, 1200 Chestnut St, Philadelphia, and contract awarded.

—*Pennsylvania, Philadelphia. The Wakefield Hosiery Co. expect to have their new mill in operation by the 1st of September. They will manufacture the finest grade of seamless hosiery, employing about 300 hands. There will be 200 knitting machines, dye house, steam power. Capital stock $50,000., all paid in. Charles Chipman, president; Wm. V. Parker, treasurer; Martin C. Hall, supt. Mr. Chipman was formerly of Charles Chipman & Sons of the same place, and now Charles Chipman's Sons of Easton, Pa.

—*Pennsylvania, Pottstown. Fritz & Krouse, proprietors of the Royersford Hosiery Mills, whom we reported were to establish a branch factory here, inform us that the production of goods began about Sept. 1st. They will operate about 40 machines, using gas engine for power.

This branch has become a necessity, through their increasing business and lack of sufficient help at Royersford. The Pottstown branch will be mostly for misses and half hose, and they will do the looping there. It will be enlarged from time to time as the necessity demands.

Enlargements and Improvements.

—*Indiana, Fort Wayne. The Fort Wayne Knitting Mills inform us that they have placed orders for their additional machinery. Their plant will be enlarged at once, and with this increased production they hope to manufacture full fashioned hosiery in competition with foreign goods, which they claim they would be unable to do under the new tariff with their present smaller output.

—*North Carolina, Scotland Neck. The Scotland Neck Cotton Mills write us that they will put in 50 new knitting machines, employing 40 additional hands. They are running on cotton hosiery and underwear.

—Pennsylvania, Nazareth. The Nazareth Co. has let the contract for their three story brick addition. The mill will be 100 X 40, with an engine house 16 X 42.

Mills Starting Up.

—Connecticut, Rockville. More than 20 stockinet machines are now running at the Fitch Mills, which have been recently started up under the new management.

—Massachusetts, Farley. The Orange Knitting Co. have moved into their new factory, which has been previously reported as building.

—New Hampshire, Hillsboro Bridge. The Contoocook Mills have started up on full time.

—*New York, Sherburne. In reference to the knitting mill project, the company held a meeting to consider the proposition of John Wild, of Utica, and others, relative to starting up the old knitting mill plant, and it is believed that $9000 or $10,000 will be taken by the townspeople. A committee was appointed to confer with Messrs. Wild and John McLaughlin, to consider the matter further. It looks as though the plant might be started up.

Silk.

New Mills.

—Connecticut, Willimantic. The Moosehead Silk Co., which recently bought the braiding and fish line machinery from the L. D. Brown & Sons Co., which was formerly in the Natchaug mill, is now operating some of this machinery in the fourth story of the Morrison Building. It contemplates erecting a plant which will employ about 40 hands.

—New Jersey, Paterson. Stern, Pohly & Hermann is the name of a new firm which will manufacture broad silks. They have leased the old Cooke Locomotive Works and will install 150 looms and auxiliary machinery, giving employment to about 300 hands.

—*Pennsylvania, Bath. Hughes & Co. is the name of the concern which is building the new silk mill here. Ground has been broken, and the work will be pushed forward to completion. Through the efforts of the Board of Trade, $15,000 was subscribed in Bath. It will be a two story brick building, 130x46. It is hoped to be ready to begin operations by the 1st of November.

—Pennsylvania, Coatesville. Reiling, David & Schoen, large silk manufacturers, who have a plant at Weehawken, N. J., have made a proposition to build a silk mill, provided they be given a free site for the building and exempted from taxation for ten years. They ask no bonus, and employ from 400 to 500 people.

—*Pennsylvania, Leighton. Eugene W. Baer & Co., of Paterson, N. J. have started foundations for a new silk mill here, and expect to have the same in operation by Nov. 1, employing 100 hands. Steam power. Hard silks will be produced.

—*Pennsylvania, Marietta. The new silk mill which Ashley & Bailey Co. are building is now under roof, and the work of setting up the machinery will soon be completed.

—Pennsylvania, Philadelphia. Schwinn Bros. have purchased the mill formerly occupied by Aaron Jones & Sons, on Wistar St., near Germantown Ave. For four years the plant has been closed. Schwinn Bros. will manufacture silks and brocades. The work of removing the old machinery has begun, and the renovation of the plant, and its equipment with new machinery, will be pushed forward as rapidly as possible.

—Pennsylvania, Plymouth. A new silk mill will be started at this place. It will be known as the Atwood Silk Co. The practical man of the company will be J. Atwood, formerly of the New London and Stonington, Ct. They will use the Roxburgh Mill building, which will be equipped for a plant of 10,000 spindles. Mr. Christopher Wrenn, who was formerly interested in the Roxburgh Mills, was largely interested in bringing it about. We understand that the knitting industry formerly conducted by the Roxburgh mill has been abandoned.

Enlargements and Improvements.

—Pennsylvania, Allentown. A three story brick addition 50 x 50 will be built for the Palace Ribbon Mfg. Co.

—*Pennsylvania, Williamsport. The addition to John N. Stearns & Co.'s silk mill will be 219 x 127, one story high, and will be used for a weave room. It is understood to be the intention of the company to move their machinery from their New York City mill to Williamsport. They operate 30,000 spndles and 900 looms in New York.

Miscellaneous.

New Mills.

—*Iowa, Decorah. The American Linen & Fibre Co. was recently incorporated at Milwaukee, Wis. to manufacture in this place linen fibre from flax strand, which will be offered to the trade as a substitute for cotton in woolen goods. It is claimed that it is much stronger than cotton. An old paper mill here will be fitted up, and started about Sept. 10, employing about 12 hands at present. Capital stock is $500,000. President, A. C. Place; treasurer, Phil. Allen, Jr.; supt. James E. Lappen. The company does not intend having a woolen mill. They will simply sell the fibre to the woolen trade.

—Maine, Portland. The Union Linen Co. has been organized for the purpose of

manufacturing absorbent linen, jute and other fibres, spinning and weaving yarns, manufacturing pulp and paper from flax. Josiah C. Ward of Portland, Me. is the president, Henry L. Cheney of Deering (a suburb of Portland) is treasurer.

—Massachusetts, New Bedford. It is probable that a large bleachery will be established here; 160 acres of land in Lakeville, near the Myricks Railroad Station, has been purchased by a syndicate of mill men, represented by J. Frank Knowles, treasurer of the Acushnet and Hathaway Mills. For some time past, the question of securing a proper water supply has been considered, and it has been found that artesian well water on this property is in sufficient supply and proper quality to warrant securing the land.

—New Jersey, Camden. Loeb & Schoenfeld, proprietors of the Camden Curtain & Embroidery Co., Front & Pearl Sts., will build a four story factory 60 x 100, adjoining their present mill. This plant will make Swiss laces, and employ about 200 hands.

—New York, Cohoes. Morris Myers, from Troy, has started a bedquilt factory. The machinery is being placed in position, and will give employment to about 25 hands.

—*North Carolina, Tarboro. John F. Shackleford informs us that the Philadelphia parties who visited the town several weeks ago, Messrs. Morningsted & Forthenber, have since written him that they have decided to locate their dye plant in Tarboro, and will put up a building 40x100, 60 h.p. boiler, etc. We do not know their Philadelphia address, and would suggest that any mail matter be sent in Mr. Shackleford's care.

—*Pennsylvania, Chester. T. I. Birken & Co., the extensive lace manufacturers, who have foreign plants in different countries abroad, as well as a branch factory in Philadelphia, are the parties referred to in our recent report of a new lace curtain plant to be started here. Their Philadelphia representative, J. W. Smith, has been investigating the advantages of this location, and the Delaware County Trust Co. have offered to furnish the ground to erect suitable buildings, and equip them with power and machinery or a ten years' lease. The matter has been laid before the firm in England, and it is expected it will be decided soon.

Enlargements and Improvements.

—New York, Waterford. An extensive addition is being built to the Waterford Dye Works, James A. Ranney, proprietor. A new dyeing machine will be put in, and they are increasing the capacity to 5000 pounds daily.

—*Rhode Island, Providence. The Providence Dyeing, Bleaching & Calendering Co., 52 Valley St. write us that their additions will consist of two stories added to old packing room, and converting new packing room into a tinter room, to increase their tinting capacity about 50 per cent.

Mills Starting Up.

—Pennsylvania, Philadelphia. The Hinckley knitting mill on Worcester St., Germantown, which has not been in operation for five years, will be started up in a short time by John N. Schwehm as a hair cloth and upholstery factory. The Chipman Mills on Wakefield St., opposite Ashmead, are also reported as to resume operations.

Fires.

—Minnesota, Rochester. The new Rochester Woolen Mill was very seriously damaged by fire in August. The loss to the machinery and building was about $7500, which was covered by insurance. The damage will be immediately repaired.

—New York, Titusville. The old woolen factory formerly operated by E. Titus & Sons, was completely destroyed by fire last week. The mill has not been run for four or five years. Most of the machinery had been removed.

—Pennsylvania, Chester. The mills of J. Wm. Lewis & Co. were damaged by fire on Aug. 18th, to the extent of $1500 to $2000. Fully covered by insurance.

—Rhode Island, Chepatchet. The woolen mill of Henry C. White & Son of this place was completely destroyed by fire Aug. 19. The fire started in the engine room about midnight. The mill pump could not be successfully worked, and the fire in the large mill building was soon beyond control. The mill when in full operation employed 1000 persons, but it has not been running full for the past six years. The loss is estimated at $20,000 insurance $150,000.

—Rhode Island, Woonsocket. Fire in the drier of the River Spinning mill caused a fire which was put out by the mill fire department, without serious loss.

Facts and Gossip.

—Alabama, Selma. At a meeting of the stockholders of the Selma Cotton Mill Co., it was voted to increase the capital stock from $100,000 to $200,000.

—Alabama, Selma. At the advertised sale of the Matthews mill property Aug. 13, the upset price of $35,000. was not offered, and it is expected that the property will be again offered at a lower price. Several efforts have been made to sell this property during the past few months.

—Connecticut, Madison. H. J. Griswold, who has been manufacturing golf and bicycle hosiery under his patents for fashioning ribbed goods on the Griswold machine, has leased his business and plant to a new company lately organized by New Haven people, to be known as the Lenox Knitting Co. They expect to increase the business. The directors are Adolph Mendel and Isadore Freedman, of the firm of Mendel & Freedman, New Haven, together with Mr. Griswold, who remains with the company as manager of the factory. Mendel & Freedman finance the concern and sell the product.

—Connecticut, Montville. The Montville Woolen Co., P. H. O'Keefe, proprietor, has restored the scale of wages that was in effect before the general cut. They are running full time, with good orders ahead.

—Connecticut, Williamantic. M. A. Sullivan has bought the Conantville Mill property here, formerly owned by the insolvent Natchaug Silk Co. The property consists of an old wooden mill, a new dye-house and water privilege. Mr. Sullivan declines to state his plans regarding the property.

—Illinois, Chicago. The Klondyke Mfg. Co. has been organized at Portland, Me. for the purpose of manufacturing, converting, buying and selling textile and

other fabrics. $10,000 capital stock. George W. Ross of Malden, Mass. is president, Richard D. Floyd of Chicago is treasurer.

—Maine, Dexter. At a meeting of the stockholders of the Dexter Woolen Mills Aug. 12, it was decided to offer the property for sale at auction at the office of the company, Dexter, Oct. 21, if not disposed of at private sale before that time. The mills have been closed since February, 1897.

—Maine, Rumford Falls. A new company is operating the woolen mill here, viz. the Noone-Minchen Co. The mill formerly made paper makers' felt, but is now running on what is called "improved laundry cloth," a patented fabric, made on special wide looms. It has a linen face and a wool backing, making an elastic cushion for laundry rolls. Charles H. Noone is president, Samuel T. Train of Train, Smith & Co. of Boston, is treasurer, James T. Winchen is general manager, and O. A. Sawyer, formerly of Lowell, Mass is superintendent. The mill is now working with a full force, and running nine looms. The departments are in charge of the following overseers: Harvey Neil, weaving and dressing; O. B. Matthews, carding and finishing; A. E. Roberts, spinning; J. Flohr, wool sorting and scouring.

—Massachusetts, Clinton. The deeds have been passed transferring the real estate of the Lancaster Mills Corporation to the Metropolitan Water Board, who will take possession as soon as possible under the terms of the agreement. Eventually the mills will be torn down. This does not affect the Lancaster Gingham mills.

—*Massachusetts, Fall River. The Arkwright Mills now under construction have received their charter of incorporation. The papers filed show the capital stock to be $200,000; Jos. A. Bowen, president; John P. Bodge, treasurer. Directors, Thomas D. Covel, William N. McLane, Patrick Keenan, Leontine Lincoln. The principal shareholders are Seth A. Borden, 100 shares; George B. Eddy, 250; R. T. Davis, 400; John P. Bodge, 500; C. H. Sears, 500; L. Lincoln, trustee, 300; Covel & Osborn, 150; Patrick Keenan, 150; Muller & Johnston, 100; Wm. H. Jennings, 100.

—Massachusetts, Franklin. It is reported that the machinery of the Unionville Mill, now idle and owned by the Franklin Cotton Mfg. Co., W. F. Ray, treasurer, will be sold and removed, which indicates that the contemplated addition will be built and new woolen machinery put in. It has been rumored for a long time that this plant would be converted into a woolen mill.

—Massachusetts, Highlandville. The outlook in the knitting trade, the staple industry of this town, is much better than last fall. Few towns suffered more under the Wilson law than this, and the joy over its repeal was correspondingly great. The mills are taking a new lease of life, and whilst there has been no boom, yet there is a gradual and perceptible change toward better times.

—Massachusetts, Milbury. The personal property belonging to the estate of Newton Darling, Millbury Woolen Mills, was sold at auction on Aug. 5. It included raw material, manufactured cloth, dyestuffs, and general supplies, and was attended by a number of manufacturers in the Blackstone Valley, and some dealers in New York and Boston. S Rawitzer of New York was the heaviest purchaser. S. L. Hecht & Co. bought the cloth. Very fair prices were realized.

—Massachusetts, Millbury. The F. A. Lapham mill property is to be sold at auction Aug. 26, by the present owners, Batcheller & Lane of Keene. The mill was last operated for a short time by the Millbury Woolen Co., which failed, and whose personal property was sold out last week. It is well equipped, and with the present outlook, is likely to be bought by parties who will start it up at once.

—Massachusetts, New Bedford. The organization of the Howland Mills is now completed, and the property will be turned over to the new company. Andrew G. Pierce, Jr., now treasurer of the Pierce Mill, has been elected treasurer and manager. Frederick Grinnell of Providence is president, and the new board of directors consists, besides those mentioned, of Gilbert Allen, Thomas M. Stetson, Otis N. Pierce, David L. Parker, with two vacancies yet to be filled

—Massachusetts, North Andover. The Brightwood Mfg. Co., of which B. Sagehomme is president, is looking for a new location. They manufacture dress goods, and operate 36 looms. Their business is extending, and they need more room. They are considering the advantages of several different places.

—*New Jersey, Deckertown. The towel factory which is being built here will be occupied by the Mellor Mfg. Co., which has formerly been located at 52 Garfield Ave., Paterson. The townspeople have built a mill for Mellor, and agreed to exempt the property from taxation for a period of ten years.

—New Jersey, Passaic. In fulfillment of their promise to advance wages, the Algonquin Co. have increased wages 10 per cent. to 15 per cent.

—New Jersey, Paterson. A curious condition of affairs prevails in regard to the wage question. The United Broad Silk Weavers' Union has adopted a schedule of wages, which, in many instances, is lower than the weavers are to-day receiving. It is hardly expected, however, that the weavers will beseech their employers to reduce their wages to the level of the Union scale.

—New Jersey, Paterson. The Knickerbocker Silk Co. has been granted an extension of time on paper maturing this month. E. Palladine was appointed by the creditor's trustees to take charge of the business until the notes were paid.

—New Jersey, Raritan. The Rarjtan Woolen Mills and the Somerset Mfg. Co., which are controlled by the same management, have voluntarily restored the reduction of ten per cent. in the wages of their employees, which was made four years ago. It affects 1200 operatives.

—New York, Elmira. It is reported that negotiations are pending for the transfer of the knit goods business now carried on at the Monroe County penetentiary in Rochester to this city, and the location of the business in the Elmira Woolen Mills, which have been shut down since the death of Francis Hathaway, the former owner. The new state law prohibits the manufacture of such goods in the prisons and penetentiaries, hence the necessity for the change of location.

—New York, Ilion. A charter of incorporation has been granted to the Imperial Knit-

ting Co., who operate a knitting mill here and have recently increased their capacity. Capital of $7500. Wm. S. Clark is manager, and Seth G. Heacock is the largest stock holder.

—New York, Mechanicville. John McCauley, of Little Falls, N. Y., who operates the Beaver Knitting Mill at this place, has purchased from the bank the knitting mill lately operated by W. C. Hazer & Co., which is equipped for the manufacture of ribbed underwear; 24 knitting machines. Mr. McCauley has not yet decided whether to move the machinery to the Beaver Mills, in Little Falls, or continue the plant independently at Mechanicville. Mr. Hazer, who operated the mill previously, failed some months ago.

—*North Carolina, Milledgeville. At the sale of the Yadkin Falls mill, the property was bought by the Eldorado Cotton Mfg. Co. for $31,000., subject to the mortgage. This does not quite cover the indebtedness of the old company, and leaves nothing for the stockholders. There was some competition for the property. The mill contains 4000 spindles. The new owners will make radical improvements.

—*Pennsylvania, Philadelphia. Albert Sykes & Co. report the following information concerning their new rug plant. It contains ten looms operated by steam. The product is Axminister rugs and beam rugs. The business was formerly conducted in England.

—Penn-ylvania, Schuylkill Haven. A meeting of the underwear manufacturers in the vicinity of Schuylkill Haven was held recently to consider the state of trade, and endeavor to discuss means for the improvement of the condition of the underwear manufacturers. J. Edmund Stanton was chosen secretary, and a committee was appointed to issue a circular to other manufacturers besides those present, asking them to meet at Reading at an early date, to discuss further steps to be taken.

—Pennsylvania, Pottstown. The Parkerford Knitting Mills, Wismer, Heistand, Booth & Co., proprietors, are negotiating, with the idea of locating here or elsewhere, as they are not able to secure sufficient help in their present location.

—*Rhode Island, Saylesville. We have official information concerning the Crefeld Waste and Batting Co. Lawrence T. Lockwood is president, Charles F. Burnham, treasurer. They operate 18 batting cards. This is an incorporation of the business conducted by the Crefeld Mills' comfortable department.

—South Carolina, Cheraw. H. W. Finlayson writes that neither the Finlayson Knitting Mills nor the Cheraw Knitting Mills, which were burned last June, will be rebuilt for the present.

—Tennessee, Memphis. It is now expected that the holders of various securities of the Bluff City Cotton Mills will come to some agreement without litigation, and that the property will be sold to the highest bidder Sept. 16. Some months ago the plant was advertised for sale, but the different interests could not come to an agreement. It is expected that the plant will be put in operation by the buyer as soon as possible.

—Vermont, No. Bennington. We learn from official sources that the Vermont Cotton Mills have not yet been leased or sold, but is on the market for either lease or sale, and the secretary of the Board of Trade informs us that good inducements will be offered to anyone interested in such a plant.

PERSONAL RECORD.

Cotton.

—John H. Stevens, formerly with the Brookside Cotton Mills, Knoxville, Tenn., is now superintendent of the Alabama Cordage Co., Montgomery, Ala.

—H. H. Jaquith, recently accepted a position in charge of the carding at the Ballou Mills of the Attawaugan Co., Baileuville, Ct., in place of George Mills, who has resigned on account of ill health.

—John G. Loeckler, and not Henry LaClair is boss weaver at Centreville Mills, Centreville, R. I. in place of Alfred Stafford. Mr. Loeckler was formerly designer and boss weaver for the Valley Falls Co., Valley Falls, R. I.

—George Sanderson, who holds position of overseer of the cloth room of the Hargraves Mill, No. 2, Fall River, will take charge of the consolidated rooms when the change is completed. With this last change, a double system will be carried on throughout; the overseers of each room in the Parker Mill taking charge of the same room in the Hargraves Mill.

—S. S. Campbell, carder at the Gastonia (N. C.) Cotton Mfg. Co.'s Mill, has been offered a position, which he will accept, with the new Louise Yarn Mills, of Charlotte.

—William Prescott succeeds Edward Coburn as second hand in the weave room of the Laconia Co., Bideford, Me. Archie Maxwell is overseer of weaving.

—Edward Coburn, formerly second hand in the weave room of the Laconia Co., Biddeford, Me., has gone South to accept a position as overseer of all the weaving in the Vaucluse Mill, Vaucluse, S. C.

—The Centreville, (R. I.) Cotton Mill Co. have secured the services of Albert A. Pingree as foreman of the ring spinning department.

—F. H. Johnson, overseer of the spinning room at the mill of the Boston Duck Company, will resign his position there to accept one similar to it at Galveston, Texas.

—A. E. McDonald, formerly superintendent of the Douglassville mill at Douglassville, Ga., is now manager of the Dixie Cotton Mill, LaGrange, Ga.

—A. D. Milliken is now at the Canoe River Mills, Taunton, Mass., as boss carder.

—W. R. Odell, secretary and treasurer of the Odell Mills, Concord, N. C., has gone on a trip to Canada with his wife. He will return by way of Niagara Falls and New York.

—D. M. Carpenter, treasurer and superintendent of the Providence Cotton Mills and superintendent of the Union Cotton Mills, both at Maiden, N. C., has been appointed postmaster at that place.

—J. S. Clayton, of Wilmington, Del., has succeeded D. S. Maguire as dyer for the Hope Mills Manufacturing Co., Hope Mills, N. C. Mr. Maguire has returned to his home in Manayunk, Philadelphia.

—William Redd succeeds J. W. Thompson as overseer of weaving at the Saxegotha Cotton Mill, Irene, S. C. Mr. Thompson, who has been working at weaving for the past thirty-three years, resigned on account of ill health, and will go to his farm in Carter, Ala.

—George Florence has severed his connection as superintendent with the Beaumont Mfg. Co., Spartanburg, S. C. He has returned to the R. D. Cole Manufacturing Co., Newman, Ga., for whom he worked previously.

—E. A. Thompson, boss weaver at the Vaucluse (S. C.) Cotton Mills, has succeeded Capt. J. R. Neisler as superintendent of the Rock Hill (S. C.) Cotton Factory. Mr. Neisler, who held the position for sixteen years has resigned in order to devote his time to the gin and grist mill business which he entered several years ago at Rock Hill.

—B. M. Cates has succeeded J. E. Williamson as superintendent of the Ossipee Mills, Elon College, N. C. Mr. Williamson, who has been with the firm fifteen years, left in order to accept a like position with the Beaumont Manufacturing Co., Spartanburg, S. C.

—W. H. Sharpe, who formerly held position as overseer of weaving at Saxapahaw, N. C., is now fixing looms at the Erwin Cotton Mills.

—N. F. Harris has resigned his position as section boss in No. 4 spinning department of the Odell Mills, Concord, N. C., to accept one at Spartanburg, S. C.

—John Beal, boss dyer at the Manchester (N. C.) Cotton Mills, has removed to Greensboro, N. C., with his family, at which place they will be employed in the Proximity Mills.

—J. D. Bacon is now boss carder at the Pearl Cotton Mills, Durham, N. C. He was formerly with the Cannon Mfg. Co., Concord, N. C.

—Neill Clark, boss carder and spinner at the Manchester Cotton Mills, N. C., has removed, with his family, to Greensboro, N. C., at which place they will be employed at the Proximity Mills.

—W. J. Allen has removed to Atlanta, Ga. He was formerly at Toccoa, Ga.

—J. H. Wilson, formerly of La Fayette, Ga., is now at Trion Factory, Ga.

—Chas. M. Burgess, formerly of Pacolet, S. C., is now at Newry, S. C.

—D. M. Shealey has left his position at Langley, S. C. and gone to Augusta, Ga.

—E. J. Wolfe has succeeded W. F. Andrews as boss weaver at the Tucapau Cotton Mills, Wellford, S. C. Mr. Wolfe held the position some time previously.

—G. C. Pruitt resigned his position as superintendent with the Tucapau Cotton Mills, Wellford, S. C., August 16.

—Jas. F. Cabaniss is now in charge of the card room of the Rocky Mt. (N. C.) Cotton Mills. He was formerly at Gastonia, N. C.

—Thos. Nance has been promoted to be night overseer of carding at the Gastonia (N. C.) Cotton Mfg. Co.'s plant. He formerly held the place of card grinder.

—Louis Carter, recently second hand in the spinning room of the Otis Co., Ware, Mass., under Thos. H. Conley, overseer, has gone with the Barnesville Mfg. Co., Barnesville, Ga.

—Chas. L. Strolls recently at Atlanta, Ga., has accepted a position as overseer, of carding with the Lockhart Mills, Lockhart, S. C., of which C. Beach is superintendent.

—Albert Perry, who has been out for six weeks with rheumatism, has returned to work as loom fixer in Central Mills, at Southbridge, Mass.

—William Marland, of Ware, Mass., who has been overseer of spinning in the Otis Company for the past six years, died at his home, Sunday morning, August 15th.

—John W. Chadwick, overseer of weaving at the Metacomet Mill, Fall River, will succeed John Goss as overseer of weaving in Mill No. 3 of the Fall River Iron Works Co.

—Mr. F. D. Williams, of the Merrimack Mfg. Co., has been appointed to succeed C. Carry as treasurer of the Fiskdale Mills, Fiskdale, Mass. Mr. Carry retires on account of ill health.

—Timothy Corbett, boss cotton spinner at Amesbury, Mass., met with a very serious accident recently. While riding a bicycle, he fell from his wheel, breaking his collar-bone and receiving other injuries which may prove fatal.

Woolen.

—James J. Regan, the well known shoddy and woolen manufacturer of Rockville, Ct. died very suddenly on Aug. 6 from heart disease. He was about 63 years old, and has been manufacturing in Rockville since 1869. He was prominently identified with many of the interests of the town, and one of its leading citizens.

—Henry Balbian has resigned his position as superintendent of the North Andover Mills, North Andover, Mass. Mr. Balbian was formerly at Stafford Springs, Ct. He goes to Lowell. John H. Sutton who formerly filled the position, assumes it again.

—F. C. Paterson is the new superintendent at the Highland Mills at Huntington, Mass. He takes Mr. Taylor's place.

—James Brown, boss dyer, has resigned

his position at Dews mill at N. Dexter, Me. and gone to Newburgh, N. Y.

—Charles H. Woodbury of Franklin is now superintendent of S. A. Owen's mill at Hope Valley, R. I.

James Jasmine has been promoted to be superintendent in the American Worsted Co.'s mill in Woonsocket. Mr. Brogden, who formerly held this position, has gone with the Sawyer Woolen Co. at Dover, N. H.

—Lyman Copeland has taken a position as boss finisher at the Oak Valley Woolen Co.'s mill, Tarkiln, R. I., in place of J. O'Keil.

—N. P. Dempsey, formerly with the Lawrence Dye Works, and also with the Nonantum Worsted Co., has accepted a position with the Harway Dyewood Extract & Mfg. Co.

—Edwin Lombard has resigned his position as superintendent of Ackers & Taylors' mill at Charlton City, Mass.

Edwin W. Swift has been elected president of the Muscogee Mfg. Co., Columbus, Ga. James P. Kyle was elected secretary and treasurer.

—James Robertson, owner of the Robertson Worsted Mills at Passaic, N. J. died last week after a short illness. Mr. Robertson was an Englishman, and came to this country soon after the passage of the McKinley bill, and built a worsted mill, which he has operated successfully ever since. He was 55 years old. He leaves a widow, but no children.

—The Windsor Falls Co., of Adams, Mass., have secured the services of T. J. Cahill as overseer of spinning.

—Fred Pfeiffer has accepted a position as overseer of weaving in the Pekin Mill, Manayunk, Pa.

—Alexander Knox caught his hand in a card at the mill of Schofield, Mason & Co., Philadelphia, Pa., and had three fingers lacerated.

—John Leonard has accepted a position as carder at the Madison Woolen Mills, Madison, Me. He was formerly carder at the Collins Mills, Collinsville, Mass.

—Elmer Eldredge, of Providence, has accepted a position as boss finisher at the S. A. Owen Mill, Hope Valley, R. I.

—John Pothier, second hand in the Contrexville Mill, Manville, R. I., has resigned his position.

—Harry Grimwade has been promoted to the position of superintendent of Akers & Taylor's satinet mill, at Charlton City, Mass. Mr. Grimwade succeeds Darwin Lombard.

—The Thomas Kay Woolen Mill Co., of Salem, Oregon, have opened a salesroom at 43 Leonard St., New York, with Thomas B. Kay in charge.

—F. C. Patterson succeeds Mr. Taylor as superintendent of the Highland Mills, Huntington, Mass.

—James E. Brines has accepted a position as overseer of the wool room of the Campbell Mills, Potter Hill, R. I. Mr. Brines' thorough knowledge of all kinds of wool and his experience as an overseer and scourer will render him of valuable assistance to the Campbell Mills.

—Thomas Goggins, formerly at Ray's Mill, Franklin, Mass., has accepted a position as spinner at Dayville, Conn.

—Edward Craven, superintendent of the Watervliet Mills, West Troy, N. Y., has been on a trip visiting his many friends in Boston and Graniteville, Mass., and also his parents at Geneva.

—Maine, Pittsfield. Alfred Webbendoerfer, 12 years boss weaver with the Pioneer Woolen Co. has resigned and will live hereafter on his farm.

—Thomas Farrell has been appointed to succeed William H. Smith as master mechanic in the machine shop of the American Worsted Company, of Woonsocket, R. I. Mr. Smith has been in charge of the machine shop for a number of years.

—Benjamin Barnett of Blackstone, has been appointed boss wool sorter of the American Worsted Company at Woonsocket, R. I.

—Scott Maxwell, whose brother Archie Maxwell is overseer of the weave room in the Laconia Co.'s Mill, Biddeford, Me., has charge of a department in the Vaucluse Mill, Vaucluse, S. C.

—George G. Wilson, who was formerly boss weaver of the Madison (Me.) Woolen Mill, has returned and will take charge of the weave room.

—John Bruns, who held a position as overseer in one of the departments of the Farwell Worsted Mills, Central Falls, R. I., has resigned. Mr. Burns has been with the company since the establishing of the plant at this place.

—Thomas Smith has resigned his position as overseer of weaving in the Dunn Worsted Mills, Woonsocket, R. I.

Knit.

—Herbert Payne, formerly with Wye Bros., Needham, Mass., has accepted a position with the Philadelphia Knitting Co. of Philadelphia in their knitting room.

—Georgia, Barnesville. William Gee, formerly vice-president of the Gee, Hanson Co., underwear manufacturers, has sold his interest in the company to J. W. Hanson, treasurer, but will remain with the company at present as superintendent.

—The Union Mfg. Co., Frederick, Md., of which Mr. Zimmerman is treasurer and Mr. E. H. Ellis superintendent, is running over time to fill their orders. It is their usual custom to shut down for the month of August to make necessary repairs, but this year they will be unable to do so. They have recently added considerable new machinery.

—W. J. Bird, who has been lately employed in a knitting mill, at Hamilton, Ont., has returned to Methuen, Mass., to accept a position with the Knitted Fabrics Co., by whom he had been previously employed.

—William J. Robinson, for seven years foreman of the shipping and inspecting department of the plant of the Knitted Fabrics Co., Methuen, Mass., has resigned his position. After a rest, Mr. Robinson will engage in a different line of business.

—James R. Robinson will succeed his brother as foreman of the shipping and inspecting department in the mill of the Knitted Fabrics Co., of Methuen, Mass.

Alizarine Black

(PATENTED)

Distinguished from all other blacks by the acid test . . .

It is an acknowledged fact that woolen goods for men's wear of American manufacture, due to the more general use of Alizarine Dyes (including the Alizarine Black), are faster in color and therefore give better service to the public than the foreign goods. This is of special importance in view of the fact that our climate with the clear skies and bright sunshine is more trying to colors than in England, Germany or France

Wm. Pickhardt & Kuttroff

NEW YORK

Miscellaneous.

—Edward Owen formerly book-keeper for the Globe Mill No. 1, Cohoes, William B. Leroy and Co. proprietor, is now in the employ of his father's mill, the Royal owned by Shaver and Owen.

—Mr. Spiers of Philadelphia has taken a position at the Wheeling Weaving Mills, Wheeling, W. Va.

—Rhode Island, Saylesville. Arthur Bingham won first prize, Alexander Pamford, second, and William Bumstead, third at a bicycle race which the employees of the bleacheries and dye works had Saturday the 21st.

—Daniel Hogan will succeed Benjamin Blazier as engineer at the River Spinning Mill, Woonsocket, R. I.

Marriages.

—Mr. Fred Hodgson and Miss Louise Emery, both of this city, were married Aug. 5th. Mr. Hodgson holds the position of assistant superintendent of the Goodall Worsted Co.

—Oscar McGowan, son of K. McGowan, superintendent of the new Arkwright Mills, Spartanburg, S. C., and Miss Nannie G. Keller, of Enoree, S. C., were married July 25.

—Sidney Smith, aged 18 years, was married July 21, to Miss Mollie Lemaster, who is the sixteen-year old daughter of Matthew Lemaster, outside overseer at Glendale. Mr. Smith is the son of assistant superintendent Smith of the Glendale (S. C.) Cotton Mills.

—Wm Livingston, assistant book-keeper at the Lockhart Mill, Lockhart, S. C., and Miss Bacon, daughter of Capt. Edmund Bacon, book-keeper of the Lockhart Mill, were married Aug. 17.

Deaths.

—Mr. James P. Bruner, of the firm of James P. Bruner & Sons, cotton and woolen manufacturers, with mills at 23rd. & Hamilton Sts. and Berks and Howard Sts., Philadelphia, died at his residence, 1733 Huntingdon St., Wednesday, Aug. 4. Mr. Bruner was born in this city, September 1815. He was a member of the Union League, but of late not taking active interest in the organization, and also member of the Masonic Fraternity. Five sons, who are all in the firm and a daughter survive him.

—James Roberts died at his home at Robertsford, Thursday, Aug. 12, at the age of fifty-five years. Mr. Roberts, who founded Robertsford, and owned the Robertsford Worsted Mills, at Passaic, N. J. A widow only survives him. As there are no near relatives of the family in this country, it is not known how the business will be conducted in the future.

—James Wild, overseer of spinning at the Barnesville (Ga.) Cotton Mill, died very suddenly. At one time Mr. Wild held the position of supt. of the Parker Simmes Hosiery Mill in New Orleans, at which place the body will be taken for burial.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Bailing Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Danforth Belting Co, 221 Chestnut St, Phila, Pa.
Fell, Geo. & Son Bolton, England.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Standard Mill Supply Co, 77 Exchange Pl Providence, R. I.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Danforth Belting Co, 221 Chestnut St, Philadelphia, Pa.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.

Bobbins, Spools, Shuttles, Etc.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I.
Woonsocket Shuttle Co, Woonsocket, R. I.

Boiler Compounds.
Imperial Chemical Co, 432 Market St, Phila, Pa.
Lord, G. W, 316 Union St, Phila, Pa.

Boxes, Paper.
Palmer, J. S, 35 Wistar St, Germantown, Pa.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braids.
See Tapes and Braids.

Burr Pickers.
Atlas Mfg. Co., Newark, N. J.
Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G Sons, Graniteville, Mass.

Business and Financial Brokers.
Riggs & Co, 575 Bourse, Philadelphia Pa.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Farnsworth Card Clothing Co., Pittsfield, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Card Feeds.
Atlas Mfg. Co, Newark, N. J
Kitson Machine Co, Lowell, Mass.
Tindell, Henry, 15 Grant Ave., Harrison, N. J.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Calico Printers' Machinery and Supplies.
New Bedford Copper Co, New Bedford, Mass.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals.
De Ronde, A, & Co, 254 Front St, New York.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.

Chemist.
Huntington, Dr. H, 159 Front St, New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Commission Merchants.
Hayes, O. H, & Co, New York.

Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.

Copper Work for Dyers.
Brabender, Chas, Sr, Paterson, N. J.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N 4th St, Phila, Pa.
Ashworth, Elijah, Fall River, Mass.
Atherton Machine Co, Lowell, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Kitson Machine Co, Lowell, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.
Mason Machine Works, Taunton, Mass.
Payne, Geo. W, & Co, Pawtucket, R. I
Saco Water Power Machine Shop, Biddeford, Me
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.
Atherton Machine Co, Lowell, Mass.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kitson Machine Co, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.
D'Este & Seeley Co. (Curtis), 29 Haverhill St, Boston, Mass.

Designers.
Fresnel, Gustave, 125 W. 56th St, N. Y.
Hand, F, & Co, Paterson, N. J.

Dryers.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Kensington Dye Works, Kensington, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Job Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Birch Bros., Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln & Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co, Springfield, Vt.
Phenix Iron Foundry, Providence, R. I.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Ashley, T. C, & Co, 145 Milk St, Boston.
Atteaux, F. E, & Co, 172 Purchase St, Boston, Mass.
Bairstow, T, & Co, 211 Pearl St, New York.
Beach & Co, Hartford, Ct.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Corey, S. J, 273 Congress St, Boston
De Ronde, A, & Co, 254 Front St, New York.
Farbenfabriken of Elberfeld Co, 77 William St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Harway Dyewood & Extract Mfg. Co, 184 Front St, N. Y.
Holliday, Read, & Sons, 109 William St., New York.
Innis & Co, 120 William St, New York.
Jaeck Bros, J, 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 79 Murray St., N. Y.
Matheson, W. J, & Co, 178 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 157 Maiden Lane, N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.

Dyers and Finishers.
Bay State Dyeing & Finishing Co, North Andover Depot, Mass.
Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.
Webster Job Dye Works, Webster, Mass.

Dyers' Clogs.
Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.
See Tapes, Braids and Edgings.

Electricity.
Beacon Lamp Co, New Brunswick, N. J.
General Electric Co, Schenectady, N. Y.

Electrotyping and Printing.
J. J. Ryder & Co, 210 Westminster St, Providence, R. I.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Salem Foundry & Machine Shop, Salem, Mass.

Engineers, Electrical.
Smeallie Bros, Amsterdam, N. Y.

Engineers, Mechanical.
Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.
Smeallie Bros, Amsterdam, N. Y.

Engraving on Wood.
Ryder Co, J. J, 210 Westminster St, Providence, R. I.

Express Money Orders and Travelers' Cheques
American Express Co, offices in every city

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.
Smeallie Bros, Amsterdam, N. Y.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N Y
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Fuel Oil Furnaces.
Rockwell, W. S, & Co, 27 Cortland St, N. Y.

Fulling Mills for Woolen Goods.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Singeing Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.

Index.
Burr Index Co, 336 Asylum St, Hartford, Conn.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).

Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.

Byram, F. A, Germantown, Pa.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Friedberger, Edgings, Germantown, Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, cor. Hope and Huntingdon Sts, Philadelphia.

Knit Goods Finishing Machines, Crochet, Etc.

Champion Sewing Machine Co, 1819 N. 5th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Von Buchwald, W. C, 120 N. 7th St, Philadelphia, Pa.

Knit Goods Brushers.

Ardrey, S. B, & Sons, Bristol, Pa.
Jones, Lewis, Philodelphia, Pa.

Knitting Machine Cylinders.

Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.
Stanton & Lewis, 318 Branch St, Phila, Pa.

Knitting Machinery.

Bohm, Albert, Agt. for R. Stahl, Germany, 114 Nassau St, New York.
Boss Knitting Machine Co, 7th and Walnut Sts, Reading, Pa.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Champion Sewing Machine Co, N. W., cor. American and Diamond Sts, Phila, Pa.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Co, South Bethlehem, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 1711 Randolph St, Philadelphia, Pa.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St. Phila, Pa.
Union Raveller Co, Troy, N. Y.

Knitting Needles.

Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 1711 Randolph St, Philadelphia, Pa.
Lydall, H, & Foulds, Manchester, Conn.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Stoops, H. R, & Co, 66 No. 4th St, Phila, Pa.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.

Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.

Beacon Lamp Co, New Brunswick, N. J.

Looms.

Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila., Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.

Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.

Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.

Stearns, A. T, Lumber Co, Neponset, Mass

Lumpers.

Gerry, George, & Son, Athol, Mass.

Machinery Dealers.

Schofield, Geo. L, 123 N. Front St, Phila,

Machinists' Tools.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.

Walder, J, Paterson, N. J.

Measuring and Folding Machines.

Curtis & Marble Machine Co, Worcester, Ms
Elliott & Hall, 54½ Harmon St, Worcester Mass.

Mill Builders and Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.

American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Hill, Jas, Mfg. Co, Providence, R. I.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.

American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Parks & Woolson Machine Co, Springfield, Vt.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Oilless Bearings.

N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.

Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Paints.

American Fire Resisting Paint Co, 17 Broadway, New York.
Devoe & Reynolds, Fulton and Williams St, New York.

Pantagraphs for Mill Engraving.

Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.

Crosby & Gregory, 34 School St, Boston, Mass.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.

Dalrymple, George, Fair Haven, Vt.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 73 Pine St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co, Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.
See Ventilating.

Power Transmitting Machinery.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
General Electric Co, Schenectady, N. Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Smeallie Bros, Amsterdam, N. Y.

Presses.
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.
Novelty Textile Printing Co, 525 W. 24th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Smeallie Bros, Amsterdam, N. Y.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Gowdey, J. A, & Co, Providence, R. I.
John Whitaker Reed Co, 194 Front St., Worcester, Mass.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roller Skins.
Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.
Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.
Gleason, A. H, Rockbottom, Mass.

Schools.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Champion Sewing Machine Co, N. W. cor American and Diamond Sts, Phila, Pa
Curtis & Marble Machine Co, Worcester, Mass.
Dinsmore Mfg. Co, Salem, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stoops, H. R, & Co, 66 No. 4th St, Phila, Pa.

Shearing Machinery
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Crompton & Knowles Loom Works, Worcester, Mass.

Singe Plates.
New Bedford Copper Co, New Bedford, Ms.

Sizing.
American Glutrose Co. Penn Mutual Bldg, Phila, Pa.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.

Soaps.
American Soap & Washolene Co, Cohoes, N. Y.
Holbrook Mfg. Co., 466 Washington St., N. Y.
India Alkali Works, Boston.
Underwood, A. J, 38 South Gate St, Worcester, Mass.

Spindles.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.
Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.
D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Newburgh Ice Machine & Engine Co, Newburgh, N. Y.
Tooley, Frank, 131 N 3d St, Phila, Pa.

Steam Separators.
D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Haines, W. S. C, 136 South 4th St, Phila, Pa.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Traps.

D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass. (return float and expansion).
Haines, W. S, 132 So. 4th St, Phila, Pa.

Tanks, Tubs and Vats.

Brabender, Chas, Sr. Paterson, N. J.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Hall, Amos H, No. 2nd above Cambria, Phila, Pa.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.

Fleming & Chapin, 215 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Kenyon, John J, Pawtucket, R. I.
Perseverance Mills, 2632-40 Mascher St Phila, Pa.
Weimar Bros, cor. Hope and Huntington Sts, Philadelphia.

Teasels.

Kellogg, Wm, W, Skaneateles, N. Y.
McLaughlin Bros, Skaneateles Falls, N. Y.

Temperature Regulators.

D'Este & Seeley Co, 29 Haverhill St, Boston.
Haines, W. S, 132 So. 4th St, Phila, Pa.

Tentering Machines.

See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.

N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.

Howard, Geo. C., 1783 Barker St., Phila., Pa

Traveler's Cheques.

American Express Company.

Turbines.

Bradway, C. P, West Stafford, Ct.
Curistiana Machine Co, Christiana, Pa.
Humphrey Machine Co, Keene, N. H.
Hunt, Rodney, Mch. Co, Orange, Mass.
James Leffel & Co, Springfield, Ohio

Valves.

D'Este & Seeley Co, 29 Haverhill St, Boston Mass.

Ventilating Apparatus.

Berry, A. Hun, 23 W. 1st St, Boston, Mass.
New England Heating & Ventilating Co Providence, R. I.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).

Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.

Watchman's Clock.

Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116 Chambers St, New York.

Water Pressure Regulators.

D'Este & Seeley Co, 29 Haverhill St, Boston.

Water Wheels.

Bradway, C. P, West Stafford, Conn.
Christiana Machine Co, Christiana, Pa.
Humphrey Machine Co, Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.

Bradway, C. P, W. Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.
Replogle Governor Works, Akron, Ohio.
Smith, J. Walter, 31 No. Foster St, Worcester, Mass.

Winders. (Hosiery.)

Payne, G. W. & Co, Pawtucket, R. I.
Universal Winding Co, 226 Devonshire St, Boston.

Wool.

Lyon, John H, & Co, 12 Reade St, N. Y.
Webb, Chas. J. & Co, 156 N. Front St. Phila, Pa.

Wool Cleaning Compound.

India Alkali Works, Boston.

Wool Combing Machinery.

Crabb, Wm, & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.

Daly, Jas. E., Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Muhlhauser, F, Co, Cleveland, Ohio.
Sullivan, R. T, 155 Federal St, Boston, Mass.

Wool and Waste Dusters.

Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen Machinery.

Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
Atlas Mfg. Co., Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
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Hunter, Jas, Machine Co, No. Adams, Mass.
Kitson Machine Co, Lowell, Mass.
McKerrow & Bennett, 31 State St, Boston, Mass.
Payne, G. W. & Co, Pawtucket, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
White, John F, 38 River St, Providence, R. I.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.

Fowles & Co, 102 Church St, Phila.
Lyon, John H, & Co, 12 Reade St, N. Y.
Muhlhauser, F, Co, Cleveland, Ohio.
Webb, Chas. J, & Co, 156 N. Front St, Phila Pa.

Wool Shoddies.

Bowers', James, Sons, Ltd, Chester, Pa
Daly, James E, Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Muhlhauser, F, Co, Cleveland, Ohio.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.

Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.

Kitson Machine Co, Lowell, Mass.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

Kenyon, John J, Pawtucket, R. I.
Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, N. Y. and Phila, Pa.
Whittier Cotton Mills, Lowell, Mass.

Carpet Yarns.

Fleming & Chapin, 215 Church St, Phila, Pa.

Cotton Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Catlin & Co, New York and Boston.
Dana Warp Mill, Westbrook, Me.
Eichman & Sternberg, 488 Broadway, N. Y.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Tucker & Cook Mfg. Co, Conway, Mass.

Cotton Warps and Yarns.

Abegg & Rusch, 92 Grand St, N. Y.
American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa
Germantown Spinning Co, Germantown Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co., 86-88 Franklin St.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York.

Gassed Yarns.

Blodgett & Orswell, Pawtucket, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Kenyon, John J, Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Hadley Co, 95 Milk St, Boston, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Moore, C, & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Lowell, Mass.
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Abegg & Rusch, 92 Grand St, New York.
American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
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Fleming & Chapin, 215 Church St, Phila, Pa.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Holland & Webb, 487 Broadway, N. Y.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York.
Mitchell, James E, & Co, Phila. and Boston.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Porter Bros, 78 Worth St, New York.
Rockwell, E. M, Leominster, Mass
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Lowell, Mass.
Whittier Cotton Mills, Lowell, Mass.

Jute Yarns.

Eichman & Sternberg, 488 Broadway, N. Y.

Mohair Yarns.

Abegg & Rusch, 92 Grand St, New York.
Eichman & Sternberg, 488 Broadway, N. Y
Holland & Webb, New York.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Cranston Worsted Mills, Bristol, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Holland & Webb, New York.
Malcolm Mills Co, 216 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Ramie.

Holland & Webb, New York.

Silk Noils and Yarns.

Skerry, A. T, 47 Leonard St, New York.

Silk Yarns.

Chepey Bros, S. Manchester and Hartford Ct.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 215 Church St, Phila, Pa.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Porter Bros, 78 Worth St, New York.
Rockwell, Edward M, Leominster, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Abegg & Rusch, 92 Grand St, N. Y.
Alleghany Worsted Mills, Phila, Pa.
Botany Worsted Mills, Passaic, N. J.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
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Croft, Howland, & Sons, cor. Broadway and Jefferson St, Camden, N. J.
Eichman & Sternberg, 488 Broadway, N. Y.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Porter Bros, 78 Worth St, New York.
Sawyer, Manning & Co., 86-88 Franklin St, N. Y.
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Skerry, A. T, & Co, 47 Leonard St, N. Y.
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IT PAYS to consult our CATALOG when in need of Oil Extractors, Steam Separators, Engine Indicators, Exhaust Heads, Feed Water Heaters, Oil Filters. It is yours for the asking.

JAS. L. ROBERTSON & SONS,

204 Fulton St., New York. 12 Pearl St., Boston.

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD, or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

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1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1170 **Woolen Superintendent** wants a position as superintendent and designer of a small mill, or superintendent of a large mill. Age 54; marrried. Don't want a position in any of the Southern or Western states. Has worked on a great variety of goods, and can refer to reliable parties.

1290 **Manufacturer from Scotland** wishes situation as superintendent; thoroughly practical in Scotch tweeds, cheviots, Saxonies, plaids, etc., from wools to finished cloth. Will start with small salary.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

1239 **A man who understands the** manufacturing of woolens in all the details, is open for an offer. Is an experienced manager, and is at present in charge of a mill that is being run at a profit.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1231 **Manufacturer.** One who has had a thorough experience in the management of a mill of his own, and who can show proof as to his ability, is now in the market for a position as superintendent or assistant superintendent with any good company. Age 40; married.

1219 **Superintendent.** A young man who has had a practical experience in every department of a woolen mill, including designing, wishes to secure a position as superintendent, designer or both. Is highly recommended by his present employers for whom he holds a position as overseer. His strong points are on cassimeres, cheviots and Unions.

1208 **Designer or Superintendent.** Graduate of textile school. Experienced in most kinds of woolens. During the eight years very successful on fancy worsteds and cassimeres, also overcoatings 35 years of age and married. The best of references as to ability and character.

1222 **Superintendent, Designer and** Weaver. Wants a position in woolen or worsted mill. Understands the work thoroughly, on a great variety of goods.

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1266 **Cotton** superintendent wants position. Out on account of mill shutting down. Understands fancy and plain cottons, white and colored. Has a first-class record.

1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

1269 **Cotton** superintendent, carder, spinner and dresser; 43; married. Has held position in some of the best mills; is strictly temperate, and well recommended. Cotton, flannels, ginghams, crochet and Marseilles quilts, etc.

1184 **Cotton Mill Superintendent,** wants position. Age 50; married. Sheetings, shirtings, drills, etc.; also all kinds of yarns and yarn dyeing. Has good references. Superintendent eighteen years at one mill.

1236 **Superintendent** of cotton mill desires to change positions. Is thoroughly competent, steady and reliable. Good mechanic and a good manager. Has push and executive ability. Over 15 years experience, and fully understands how to keep production right as to quality, quantity and lowest cost. Best system of economy maintained. First class references can be given.

WOOLEN CARDERS.

1249 **Carder and Spinner,** woolen, wants position. Familiar with a great variety of goods. 37 and married.

1248 **Carder,** woolen. Age 37 years; married. 10 years with one of the best mills in New England. Dress goods, beavers, blankets, cotton warp hair lines and kerseys.

1230 **Superintendent or Carder and** spinner wants position in woolen mill. Age 30; married. Can take position at once. Familiar with jeans, cassimeres, flannels, knit goods and shoddies.

1233 **Felt** Overseer of Carding. A good man on felt or woolen goods. Aged 35; married. Can refer to past employers.

1082 **Woolen carder experienced on** all classes of underwear. Has worked for eight years in one mill, 29 years of age and married. Good references.

1241 **Woolen Carder.** Age 40; married. Overseer 14 years in one place. Long experience on all-wool, wool and cotton mixed, shoddy, etc. Temperate, and can furnish good references. Prefers Philadelphia.

1197 **Woolen Carder** wants position. Overseer over 16 years in some of the best woolen mills. Accustomed to all kinds of work. Age 50; married. Well recommended.

1190 **Woolen** Carder or Spinner. Age 47; married. One reeler and one piecer in family. Has been overseer and spinner for the last fifteen years for one firm, which is now out of business. Refers to past employers. Can take position at once. Familiar with wool shoddy and cotton; Furbush, Lee and other makes of machinery.

1286 First class Carder, now employed, wishes a better position. Has the best of references from good mills. Excellent manager of help. Age 35; married. Experience on broadcloth, dress goods, covert cloth and meltons.

1270 **A 1 Carder,** wool or cotton, 11 years experience, first-class references, reliable, temperate and industrious, desires immediate position. Age 30. Will go any where.

COTTON CARDERS.

1291 **Overseer of Carding and Spinning.** Would like to change from present position to something better. Familiar with Davis & Furber cards and mules, Cleveland cards, Johnson & Bassett mules. Excellent references. Has been superintendent in several mills. Could also take position as assistant superintendent of hosiery mill.

1277 Young Frenchman, with wide experience and good references, wants position as boss carder. Age 38; married.

1138 Second hand of cotton carding wants position. Has had a good experience in that position. References.

1260 **Young Man** who has worked up through carding rooms of some of the best mills in New England, wants position as overseer in New England or Middle States. Age 27. Not married.

910 **Overseer** of cotton carding. Good man on white or colored yarns, for plain or fancy work. Age 42; married.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

910 **Is a good carder** on plain, colored and fancy white stock. Age 41. $2.50 and up.

502 **A First** class cotton carder and spinner is open for an engagement. References are of the best.

WOOLEN SPINNERS.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, satinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1152 **Woolen Spinner** wants position as overseer or 2d hand, in Southern or Western States, or Pennsylvania. Age 20; single. Understands Johnson & Bassett operators and mules. Has worked on a variety of goods. Good recommendations as to character and ability.

1112 **Overseer of Woolen Spinning** wants position. Has first-class references. Age 37. Wages reasonable. Will accept second hand's position.

1276 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

COTTON SPINNERS.

1284 **Eleven years as Overseer** in first-class gingham mill, with other experience, has fitted this man for good position in charge of ring spinning, spooling and warping. Age 40. French American; married.

1223 **Wants position as Overseer of** Spinning or Twisting, or both. Familiar with fine or coarse numbers. Refers to past and present employers.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1280 **Wanted, situation** as overseer or second hand of mule spinning by a thorough, practical man. Good references from past and present employers. Understands all English makes of mules. Will go South or Canada.

1243 **Mule** spinner; cotton. Age 36; married. Prefers New York or Massachusetts; references.

1198 **Cotton Spinner,** spooling, warping, slashing, web drawing, skein winding and quilting on linen. Well recommended. Age 42; married. Has worked in some of the best mills. Will go anywhere. Would accept a good second hand's position.

1158 **Overseer of Ring Spinning,** spooling, warping and slashing wants position on white work, fine or coarse. Age 46; single. Will go anywhere. Good references. Familiar with Mason, Bedford, Lowell and Fales & Jencks machinery.

WOOLEN WEAVERS.

1008 **Wants boss job in flannel mill.** Northern New England preferred, also a good man for dresser or fixer, has worked on flannels, serges, cheviots, fancy dress goods. Is 34, married.

1216 **Weaving and Dressing.** Man wants position as overseer of weaving or dressing, or both, in some good woolen mill. Has had 16 years' experience. Can pick patterns and figure yarns. Has references.

1253 **Weaver, Designer or Superintendent** Open for a position. Refers to past and present employers. Aged 47; married. Worsted cloakings, cassimeres and dress goods.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels Will not go South, West or Pennsylvania.

1273 **Woolen** weaver wants position. Age 35; married. A first class man.

COTTON WEAVERS.

1242 **Overseer Cotton Weaving.** Familiar with plain cloths, sateens, fancy checks and stripes, box looms and dobbies. References. Age 43; married. One weaver, one twister in family.

1235 **Cotton** man wants position as overseer of cotton weaving. Prints, twills, satins, denims, cheviots, lence-, etc. Crompton, Knowles, Lowell, Whiting and English looms.

1288 **Overseer of Cotton or Worsted** weaving wants position. Familiar with all kinds of looms; plain or fancy work. Age 45; married.

1281 **Overseer of Weaving.** Englishman; age 36; married. At present employed in good mill. Would like a position paying more than $3.00. Experience on fine ginghams, plain and fancy cotton and worsted dress goods.

1261 **Weaver.** Cotton, woolen, ramie and silk goods. Good experience in first-class mills.

176 **Wanted** a situation as cotton weaver or as superintendent; am a strictly temperate man; married; 40 years old; am a practical man and a pusher. Will go anywhere, and at any price to suit the times. Will guarantee satisfaction in every respect. Now employed. Correspondence invited. Can furnish good references if required.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 28.

176 **Wanted.** A position as overseer of weaving, second hand or loom fixer, either in a cotton, woolen or jute bagging mill, by a faithful, sober, steady man, fully capable in either of the above positions. Refereneeg furnished as to character and experience.

FINISHERS.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 36 years. Will work for $2 50 per day.

1207 **Woolen or worsted** finisher wants position as 2nd hand in some first-class mill. Has had a good experience as 2nd hand, and refers to past and present employers; age 28. Especially strong on Scotch tweeds, dress goods and fancy cassimeres. Familiar with English and American machinery.

1214 **Woolen and Worsted Finisher.** A first class man. One that has had a thorough experience in one of the best mills in New England

228 **Worsted or Woolen Finisher.** One of the best men in the country. Age 36; married. English. Has had charge of the leading mills in this country. His experience covers woolen and worsted men's wear, also ladies' dress goods, overcoatings, cloaking, etc. Understands the new German finish applicable for dress goods up to eight ounces. By stiffening on the back this finish makes single warp filling goods equal to two-ply.

1285 **Young Man with Experience** on almost all lines of woolens and worsteds. He never held boss job, but feels able to fill such a position. Age 25; not married. First-class references. Would take second-hand position or as boss fuller or boss shearer.

DYERS.

1292 **Woolen Dyer** with experience also in mixes, piece dyes, rags, hosiery, black cotton, waste and shoddy. Has held boss job several years. Age 34; married. Very good references.

1279 **Ten years as Boss Dyer.** Wants position anywhere except in South or West. Can accept position at once. Specialty, cotton skein, raw stock. Age 40; married.

919 **Good Man on Knit Goods** wants position as dyer or bleacher. Age 40; married. Good references.

1278 **Dyer.** Woolen cassimeres, cheviots, meltons, overcoatings, kerseys, dress goods, shawls, Government blues.

1264 **Dyer** on cassimeres, chinchillas, kerseys, frieze, cloakings, piece dyes, raw wool, raw cotton, cotton yarns and plushes; 43; married. Fair pay. References.

1218 **Dyer of Fast Colors.** On wool and worsted in the stock, slub, yarn and piece, and who is a graduate chemist of the Massachusetts Institute of Technology. Wants a situation.

1201 **Wants** position in laboratory manufacturing, house or mills, or would accept a position as second hand of dyeing. Age 28; single. Has been employed by two of the best houses in the country. Can take position at once. Western and Southern States barred out.

1234 **Dyer,** woolen. Aged 27; married. Strictly temperate. Out of a position through causes over which he had no control. Is recommended by some of the solid men. Wool slubbing, skein and piece goods, also indigo vats.

KNITTERS.

1224 **Knit.** Superintendent. Understands all makes of machines; silk, wool, merino, worsted, lisle and cotton goods. References all right. Age 35 years.

1274 A man who thoroughly understands the manufacture of hosiery from the fleece to the case, and is a good manager. Desires to correspond with parties wishing to employ such a man.

1294 **Knitter or Machinist.** Understands seamless hosiery and latch-needle machines; ribbed hosiery and underwear. Young man; good references.

1274 **Hosiery** superintendent wants position; married. Long experience on men's, women's and children's woolen hosiery.

887 **Superintendent.** Is a practical mill man with 20 year's experience in carding, spooling and knitting. Age 35. Now employed in one of the best mills in New England.

1257 Superintendent of knitting mill wants position; is a finisher and understands every part of the business, including shipping all kinds of goods, fabrics, cotton, worsteds, silks, wool on all kinds of shapes, and flat goods; most all kinds of knitting machinery and finishing machinery; age 32; married; refers to past record.

1164 **Wants Position** as superintendent of hosiery mill, or overseer of woolen carding and spinning. 35 years of age; 9 workers in family. Has good references, and has had a good experience. For further information address No. 1164, care Guild & Lord.

1173 **Wants Position** as overseer of knitting department. Understands all kinds of machines; plush work, vertical stripes, full fashioned flat cuff, rib knitting, etc. Refers to good people who have known him for 28 years, and others; age 38, married.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1245 **Designer**, or superintendent and designer. Thoroughly experienced as superintendent and designer. References all right. Familiar with a great variety of goods.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1259 **Color Designer** or Woolen Superintendent. Age 39. Good, steady reliable man. Refers to past employers.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

1174 **Woolen Superintendent** wants a position as superintendent, designer or weaver. Age 47; married. Crompton or Knowles looms, cheviots, suitings, tricots and face goods. Don't want a position in Canada. Good references.

MISCELLANEOUS.

1283 **Laboratory Chemist** with experience in large mills and supply house desires position. A moderate salary.

1293 **Bookkeeper** with 22 years' experience in woolen and worsted mills; excellent references. Age 50. Wants permanent position with moderate salary.

1282 Foreman Roller Covering and Belts seven years, and four years foreman in large mills. Excellent references. A reliable young man.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

1271 **Engineer.** Position wanted by a young man with a second class license, as engineer or mechanic. Is a reliable man. Age 21.

1141 **Overseer of Wool Sorting** wants position. Understands sorting and grading in all its branches; 20 years experience as boss sorter. Can give the best of references from past and present employers. Is a good judge of the shrinkage of wool, and understands the selection of wool in market for mill. Has six workers in family.

1209 **Book-keeper** is open for an engagement. Will accept a position in any State. Could take a position at once. Has first-class references.

1156 **2nd Hand of Dyeing** or overseer of washing and bleaching wants position. Familiar with knit goods, wool. Age 33. Don't want a position in Canada or the Western or Southern states. Can take position at once; good references.

1162 **Good Man for Beaming Department.** On heavy sized, plain calicoes and colored cotton goods, twills and sheetings. Will go anywhere. Age 33; married. Good references.

1175 **Finisher or Dyer**, woolen goods, wants position in Western or Southern States; cassimeres, blankets, dress goods, etc. Refers to mills in which he has held position as overseer; age 43; married. References are good.

1229 **Dresser** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

1192 **Worsted Steam Dresser** wants position as overseer. Has worked in some of the best mills in England and America. Has high references; age 36; married. Has a thorough knowledge of both plain and fancy work.

1087 **Overseer of Beaming, Designing or Weaving.** 35 years of age. Married. Has worked on dress goods, silk striped shirtings, pantaloon goods, ginghams, etc. Highly recommended. Will go anywhere in the United States.

1066 **Knitter.** Age 25; single; underwear, cotton and worsted; references.

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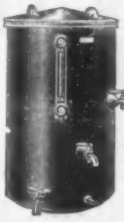

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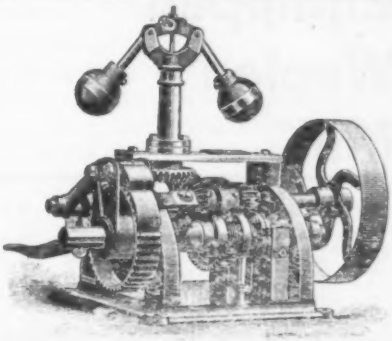

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WANTED, A LINE

to sell to the large department stores of New England, also a line of something to sell the smaller retail stores. I have a fine acquaintance and large trade in this section, and believe I can sell almost anything that is suitable to this trade. Address, "M," care Textile World, Boston, Mass.

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On easy terms. Five story brick mill, two hours from N. Y. City, in New York state. Communication by three lines of railroad. Track laid to door of mill. 70,000 square feet of floor space. Coal very cheap. Help abundant at low rates. Lot 175 feet front, 139 feet deep; Building 75 feet front, 137 feet deep; Annex 42 feet front; light on all sides. Address, J. B. J., Textile World Office, Boston.

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WANTED, second hand KNOWLES & CROMPTON Fancy Looms 100 or 108 inch reed space, 24 harness, 4 x 4 box, improved motion, in good condition. Address No. P 154, this office.

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Detailed information is given about each establishment, viz., the name of the company or firm, names of officers, agent, superintendent, what the mill makes, number sets of cards and combs (if woolen), number of spindles, number of looms, whether steam or water power, whether a dye house or not, who the selling agents are, or if the mill sells direct. In many instances it gives the name of the buyer of raw materials and supplies. To the travelling man, this directory is invaluable, as the maps give the location of the towns where there are mills, so that trips may be planned. The railroad connections are given, and distances may be estimated accurately from the maps.

IT ALSO HAS LISTS OF LARGE BUYERS OF TEXTILE FABRICS FROM FIRST HANDS INCLUDING MANUFACTURERS' SELLING AGENTS AND DRY GOODS COMMISSION MERCHANTS IN PRINCIPAL CITIES; THE MANUFACTURING CLOTHIERS, SUIT AND CLOAK MAKERS, JOBBERS, LARGE RETAILERS BUYING FROM FIRST HANDS. ALSO LISTS OF DEALERS IN RAW MATERIALS IN PRINCIPAL CITIES. BUYERS' INDEX OF TEXTILE MACHINERY AND SUPPLIES.

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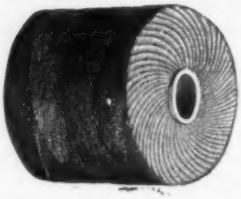

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YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Prices are being firmly maintained and knitters now realize that prices are up to stay. Spinners have orders to last for at least two or three months, but not enough to run them during the whole season. Many inquiries are being made for white cop yarn in 1/8s to 1/11s. Underwear trade has not started; orders have been placed, but at such low prices that they will not be able to deliver garments, on account of the advance in the price of yarn. Some of the knitters are trying to fill orders with inferior yarn, but even this will not save them as the spinners do not care to make waste yarn at this time. Jobbers must either pay the advance for their garments and let up on these knitters, or they will force them to close their mills. This state of affairs will teach knitters that when they take orders they should cover themselves for yarn. We may say right here that this is one of the outcomes of the New B dford Mills' troubles. The rubber boot lining trade is improving, as all of the large rubber mills are now starting on full time. This means an additional demand for thousands of pounds of cotton yarn. The hosiery trade is not at present in a strong position on account of the enormous amount of importations. By spring, this stock will be reduced, and hosiery will again take its place as a factor in American production. Last year, Germany imported over 5,000,000 dozen hosiery. Colored yarns are in demand in the finer numbers, and there is also some inquiry for silver gray and Jauger in 1/8 to 1/11, but the trade has been calling mostly for Egyptian and white yarn. The colored yarn for fleece-lined face goods has been in great demand. We note that many orders have been placed for light weight Egyptian yarns, both in combed and carded, in 1/40s, 1/30s, 1/20s and 1/18s. The prices are firmly held and orders placed at this time are for future delivery. All expect a great business this present and coming season.

Woolen Yarn. Spinners are running almost entirely on custom work. The woolen spinners, as a rule, are concerns of small capital, and have been unable to purchase wool in large amounts. The result is, that when orders are placed, these mills must buy on the market and make prices for yarn in accordance with the high priced wool. Besides, much of the yarn purchased for hosiery was bought under low priced wool. Weavers are all on light weight goods and are using either cotton yarn or solid worsted. Until they get onto heavy weights we shall look for a slow business for the spinners. We find many large mills purchasing large quantities of wool at this time at the full advance. We hear of one concern purchasing 100,000 pounds of scoured wool at 40 cents on speculation, and other mills buying wool where they would not take hold under the low prices prevailing under the Wilson tariff. It is undoubtedly a fact that few mills have over four to six months' supply of wool on hand, and many are buying on the market at this time. Wool, even at these prices, is considered a good purchase, and we predict, inside of 60 days, further importations of wool will be necessary. The business at present is mostly on light weight men's wear, and dress goods. Wool dealers refuse to make concessions of any kind. They say prices are going to be higher, and the longer they hold stock, the

(Continued on page 131.)

Frank K. Patterson, Prest. Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

GEORGE SHIMER & SON,

Spinners of Worsted Yarn for the Weaving and Knitting Trade.

All kinds of Fancy Yarns for the Knitting Trade.

5th and Erie Sts., Camden, N. J.

AMERICAN SPINNERS'

Cotton Yarn Exchange.

COMBED AND CARDED COTTON YARNS

From Northern and Southern Mills.

ARNOLD B. SANFORD, - MFRS. AGENT,

226 Devonshire Street.

BOSTON - - - - MASS.

Glazed, Bleached and Dyed

YARNS

Cone Winding.

W. WARREN THREAD WORKS.

WRITE US
WHAT YOU USE,
WE WILL DO THE REST.

WESTFIELD, - MASS.

YARNS

SOLIS - - BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

(Continued from page 129.)

more it will be worth. The heavy weight season is to be the star season of the good times.

Worsted Yarn. Spinners have all the orders they care to take. The price of yarn is very firm and is advancing. It is predicted, and the prediction will undoubtedly be a fact inside of 60 days, that 2/40s all Australian, or half Australian and half domestic delaine, will be selling for $1.00 to $1.05 per pound, and that 2/50s will sell for from $1.10 to $1.15 per pound. Spinners will accept orders only for immedia e delivery, and positively refuse orders for delivery after January 1st. Spinners are even now very cautious about accepting orders. For dress goods, 2/36 is in great demand, and any price can be secured for this yarn by spinners. The weavers have as many orders for light weights as their looms will take care of, and prices are being advanced 15 to 20 cents per yard. Weavers are all kicking themselves for having opened the light weight samples as low as they did. This time everything is coming the manufacturer's way. All stocks are reduced, and buyers realize that they have been caught for once short handed. Weavers tell us that more orders have been given within the last two weeks than they have almost received at one time in four years. It would be well for buyers to study the situation as it now exists, and they will all see the meaning of this new Dingley bill. We are back to the McKinley rates without large stocks either in the hands of manufacturers, of dealers, or importers, and the producing power of the country has been and is curtailed at least 50 per cent. In the Rhode Island district alone there are over 1500 looms idle, on account of the weavers being forced out of business during the hard times for the last three or four years. In Massachusetts there are at least 500 or 800 looms stopped, and many large

(Continued on page 133.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

SAWYER, MANNING & CO.
YARNS,
86 & 88 Franklin St., NEW YORK

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelphia, Pa.
51 & 53 Summer St., Boston.
Cotton, Woolen & Worsted Yarns
All numbers on Hand and Made to Order

O. S. HAWES & BRO.,
WEAVING and HOSIERY **YARNS,**
All Plies and Numbers.
Imported Yarns a Specialty
82 and 84 BEDFORD ST., FALL RIVER, MASS.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. Jenckes Manufacturing Co.
COLORED COTTON YARNS
Cops and Cones.
PAWTUCKET, - R. I.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG MASS.

COMBED OR CARDED
COTTON YARNS
In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

SILK LUSTRE COTTON YARNS

In single and two or more plys. This yarn retains its lustre through all usages and is increased in strength twenty to forty per cent.

High Grade **COTTON WARPS** and **NOVELTY YARNS.**

Printers of Cotton, Wool and Worsted Yarns.

The J. R. MONTGOMERY CO.,
. . . . . WINDSOR LOCKS, CONN.

Cotton Yarns AND **WARPS** Of Every Description.

James F. White & Co.
COMMISSION MERCHANTS,
54 an 56 Worth St., NEW YORK.
228 Chestnut St., PHILADELPHIA.

BURLAPS all WIDTHS and WEIGHTS.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist, **COTTON WARPS**
HOUSATONIC, MASS. 4s to 60s.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade. **PAWTUCKET, R.I.**

ELEVATORS, Hoists Waiters for any place, capacity or weight. Electric, Steam, Hydraulic or Manual Motors, Shafting, Pumps, Boilers, Pipe, Rope, Drug and Paint Mills, Presses, Gearing, Mining and Coining Machinery, Street and Road Making and Sweeping Machinery.
GEO. C. HOWARD, 1783 Barker St., Phila., Pa.

The Power Loom AND THE **Art of Weaving,**
By Alex. Brown,
For Sale by TEXTILE WORLD.
BOSTON, MASS. Price $1.25.

Continued from page 131.

spinning plants are no longer running. In Connecticut the condition is the same, and in New York State many of the large weaving plants are in a state of decay. The mills which are now in business will undoubtedly reap the benefit of this condition of affairs. If we remember, in the McKinley times factories were everywhere being started. We have reached this period at a bound, with half the woolen industry crippled. Worsted yarns have advanced on extra breds from 60 to 72 cents, and from 65 cents on 2/40s, to 90 cents. Although the weaving trade is recovering to an enormous extent, the knitters are not doing so well. We do not see a marked increase in the demand for knitted underwear or hosiery. The revival of this branch of the industry is certainly coming. Spinners of French spun yarn are advancing prices, and are anxious for the time to arrive when contracts at old prices expire. The Astrachan trade is very quiet. Every one is looking forward to the next heavy weight season, as one which will boom everything in sight.

The Philadelphia Yarn Market.

The prices of yarns have been very firm, the past month, more especially on account of the scarcity of cotton rather than the high price of it, together with the present good demand. All yarns have advanced in value, and most stocks have been cleaned up, especially cheap ones. While some people are holding back their orders, expecting cheap cotton and lower prices, the most of the dealers and spinners feel that there will be a place to put the new cotton as fast as it comes in, at pretty good figures, long before it is desirable to spin, and in the meantime, all manufacturers are clamoring for yarns. We quote:

WARPS.

20/1	14½ to 14¾ cts.
22/1	15 cts.

(Continued on page 135.)

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island **COP SINGLES**
All Numbers, 30s to 150s.
Fall River, Mass.

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER, - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
488-492 Broadway, NEW YORK.
COTTON WOOL SILK **YARNS** For Weaving Knitting or Embroidering.
HARNESS TWINES.

YARNS All Numbers and Qualities.
HOLLAND & WEBB,
478 Broadway, New York.

NEW ENGLAND THREAD CO.
PAWTUCKET, R. I.
Manufacturers of Spool Cotton & Supefine Tapes
Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 plv cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

Cotton Warps.
WHITTIER COTTON MILLS,
LOWELL, MASS.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO., Philadelphia and Boston.

Woolen Yarns
Single, also Double and Twist for Weaving Hosiery. Covert Cloth Yarns a specialty.
Raw Stock and Piece Dyeing.
CLEAR RIVER MILLS, PASCOAG, R. I.

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

BOTANY WORSTED MILLS,
PASSAIC, N. J.
Fine Worsted Yarns,
— AND —
Fine Woolen Yarns
— IN THE —
GREY, COLORS and MIXTURES.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

WEAVING and HOSIERY YARNS.
We Buy for Cash
WARPS, COPS, TWIST and SOFT SKEINS, Single, Double, 3-ply, 4-ply, etc.
COLORED YARNS for HOSIERY
on Cones, a Specialty.
Correspondence Solicited.
EDWARD S. HYDE, 223 and 225 Chestnut Street, PHILADELPHIA PA.

(Continued from page 133.)

26/1	16½ cts.
12/2	14½ to 15 cts.
14/2	15 to 15½ cts.
14/1	14 cts.
16/1	14 to 14½ cts.
16/2	15½ to 16 cts.
20/2	16½ to 17 cts.
30/2 Eastern	19 to 20 cts.
30/2 Southern	19 to 19½ cts.

SKEIN.

26/1	16 to 16½ cts.
20/1	14½ to 15 cts.
19/1	14½ to 15 cts.
4s to 10s soft	13 to 13½ cts.
10s to 12s hard	13½ cts.
12s soft	13½ to 14 cts.
20/2	16½ cts.
14/2	14 to 14½ cts.
30/2	18 to 18½ cts.
26/2	17 to 17½ cts.
40/2	23 cts.
8/3 carpet	13 to 13½ cts.
10s double reeled	13½ to 14 cts.
16/3 slack	14½ to 15 cts.
16/4 medium	14½ to 15 cts.
16/2	15 to 15½ cts.

SOUTHERN CONES.

6s to 8s	13½ to 14 cts.
10s	13½ to 14½ cts.
12s	14½ to 15 cts.
14s	15 cts.
15s	15½ cts.
16s	15½ to 16 cts.
20s	16 to 17 cts.
24s	17 to 18 cts.
26s	17 to 18 cts.

SHUTTLE COPS.

6s to 8s	13½ to 14 cts.
10s	14 cts.
12s	14 to 14½ cts.
16s	14½ to 15 cts.
26s Eastern	15½ to 16 cts.
40s "	19 to 20 cts.

MIXED COLORED CONES.

6s to 8s	14½ to 15 cts.
10s	15 cts.
12s	15 to 15½ cts.
14s	16 to 16½ cts.

EASTERN COPS.

12s shuttle	15 cts.
10s to 12s hosiery	14½ cts.
14s	15½ cts.
16s	15½ to 16 cts.
20s	16½ to 17 cts.
24s	17½ to 18 cts.

Eastern skein, 1-2 c. above cops.

Eastern cones, 3-4 c. to 1 1-2 c. above cops.

Egyptian, carded, 4 c. above white.

B. F. BOYER & CO.,

Successors to GEORGE SHIMER & BOYER,

HOSIERY YARNS,
In Wool, Merino and Worsted.

GOLF YARNS,
In Wool and Worsted. Also carry a full line

BUNDLE YARNS
For the Jobbing Trade.

516 Market St., Philadelphia.
MILLS, CAMDEN, N. J.

PORTER BROTHERS & COMPANY

Commission Merchants,
Trimmings, Buttons and Knit Underwear.
Sole Agents for
John Paton, Son & Co.,
OF ALLOA, SCOTLAND.
Specialties:
SCOTCH MIXTURES
For Sweaters, Golf and Bicycle Hose, Mitts, Gloves, etc.
78 & 80 Worth St., New York.
72-82 Lincoln St., Boston.

THE SECRET of our popularity is no secret to our customers. Experience has taught them that we give them better work and better service than they can get elsewhere.

T. BROPHY'S SONS,
Dyers of all kinds of Yarn and Cotton Warps,
Jasper Street, above Clearfield Street,
PHILADELPHIA.

Webster Job Dye Works.

Dyeing Silk, Worsted, Cotton and Wool in Skeins, Raw Stock, Tops, Slubbing, Rags and Piece Goods. Specialties in Alizarine and Indigo Colors and Fast Black on Cotton. All work warranted.

Charles F. Robinson, Manager.
Webster, Mass.

FAST FANCY COLORS.

We make a specialty of dyeing **Mode** and **Tan** shade on hosiery and yarns, as also all other fancy shades. **Colors absolutely fast.** For particulars address

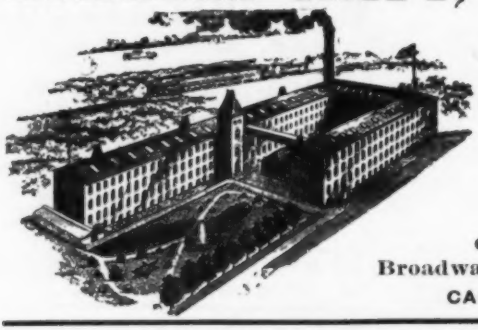
OAKDALE DYE WORKS,
913 W. York St., Philadelphia, Pa.

Combed yarns, 4 to 5 c. above carded.

There is a better demand for wool and wool spun cotton yarns, at advanced prices, although business is somewhat on the sampling order at present.

(Continued on page 137.)

HOWLAND CROFT, SONS & CO.



LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

Worsted YARNS,

ALL NUMBERS SINGLE AND TWO-PLY,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes
Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

The Competition of Foreign Goods

On staple and plain fabrics under present tariff conditions makes it almost impossible to make any money, and the only hope of profit in making Dress Goods, Cloakings and Cassimeres seems to be in using

MOHAIR OR NOVELTY YARNS.

In the United States we are the only manufacturers from raw materials to finished product who make such yarns ONLY.
Perhaps we can be of use to you.

CRANSTON WORSTED MILLS, Bristol, R. I

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 135.)

Worsted yarns have advanced sharply, with fair demand, about 15 cts. per pound.

2/40s fine . . .	90 cts.
2/30s medium . .	62½ to 65 cts.
2/20s " . .	62½ cts.

—The first bale weighing 450 pounds, and classing strict middling, reached Selma, Ala., Aug. 3, and was sold at 10 cents per pound. It was raised by Captain James F. O'Brien on his Burnsville plantation. The same party got in the first bale last year five days earlier. This is the second bale in the state this season.

—According to Dun's Review, the number of commercial failures for the first half of 1897 was less than for the corresponding season last year. The amount of liabilities, also, was less; but the liabilities involved in the failures of purely manufacturing establishments were larger for 1897 than for 1896. This latter was wholly due to the heavy failures in cotton manufacturing, which exceeded $9,200,000, against $1,300,000 for last year. The large failures in the cotton manufacturing industry were principally confined to cotton corporations at New Bedford.

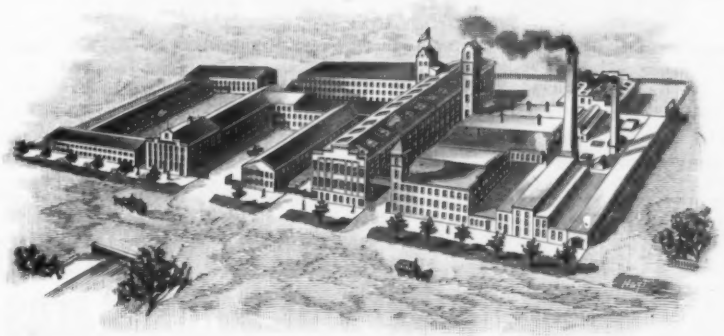
—The period covered by the past four years has been one of extraordinary trials to the dry goods business, and to the textile industries of this country.

—Poor home markets have helped our export business in cotton goods. Manufacturers have been compelled to pay more attention to foreign outlets.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

LARGEST IN THE WORLD. ESTABLISHED IN 1870.

THE F. MUHLHAUSER CO.



FINE SHODDIES, CAPACITY: 10,000,000 lbs. per Annum

Rings, Threads, Botany Yarns, Etc.

BRANCH OFFICES: 143 Federal Street, Boston. 7-9 Grand Street, Troy, N. Y. 34 No. Front Street, Philadelphia, Pa.

CLEVELAND, OHIO.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silks for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479, and 481 Broome Street, NEW YORK.
79 Chauncey Street, BOSTON.
186 Franklin Street, CHICAGO

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Goods. Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flanneletts, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines, we are prepared to give any kind of Nap required, including the French Flannel Finish.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,

28 BAYLEY ST., PAWTUCKET, R. I.

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 79 MURRAY ST. NEW YORK.

SOLE AGENTS FOR

FARBWERKE, formerly MEISTER, LUCIUS & BRUENING, HOECHST o | M.; A. LEONHARDT & CO., Muehlheim o | M.

BRANCH OFFICES:

Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 346 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

BAY STATE DYEING AND FINISHING CO.,

Yarn and Piece Dyeing a Specialty.

NORTH ANDOVER, DEPOT, - - MASS.

JOHN J. KELLER & CO.,

104 and 106 MURRAY STREET,
NEW YORK.

220 Church St., Philadelphia. 135 Pearl St., Boston.

Aniline Colors,
Dyewood Extracts,
Sumac and
Nutgall Extracts.

FAST COLORS for wool dyeing, one dip cotton colors, novelties and specialties for calico printing.

—— MANUFACTURED BY ——

JOHN R. GEIGY & CO., Basle, Switzerland.

Wm. J. Matheson & Co., Ltd.

IMPORTERS AND
MANUFACTURERS OF

DYE STUFFS

New York,
Boston,
Philadelphia,
Providence,
Charlotte, N. C.,
Montreal, Canada.

FARBENFABRIKEN OF ELBERFELD CO.

77 William Street, New York. *68 Batterymarch St., Boston*
11 North Front Street, Phila. *145 Kinzie Street, Chicago.*

Aniline Colors, Alizarine, Dyestuffs.

SOLE IMPORTERS OF THE WELL KNOWN ALIZARINE AND DIRECT DYEING BENZIDINE COLORS.

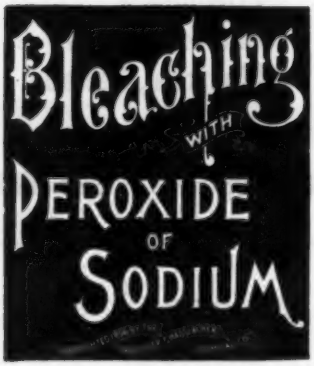
—— MANUFACTURED BY ——

FARBENFABRIKEN, formerly FRIEDR. BAYER & COMPANY, Elberfeld and Barmen, Germany.

Sole Agents of the Hudson River Aniline Color Works, Albany, N. Y

BLEACHERS:

WRITE FOR PAMPHLET ON:



Having started our Peroxide Works at Niagara Falls, we are prepared to execute the largest contracts promptly, and at greatly reduced prices.

The Roessler & Hasslacher Chemical Company,

100 William Street, Woodbridge Building,
NEW YORK.

THE STAMFORD MANUFACTURING CO.

MANUFACTURERS OF

CUT and GROUND DYEWOODS,

Dyewood Extracts and Liquors,

FLAVINES.

Importers of CHEMICALS and DYESTUFFS.

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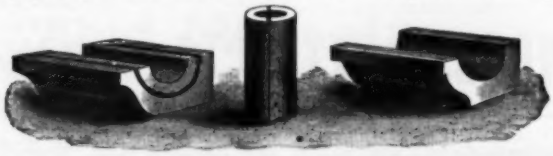

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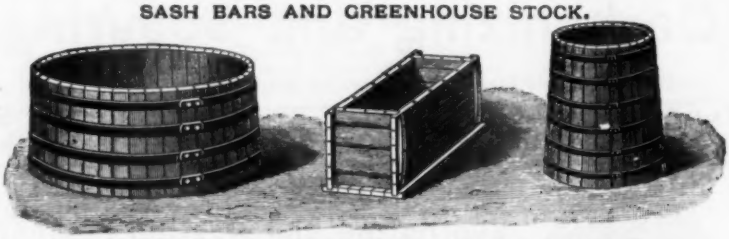

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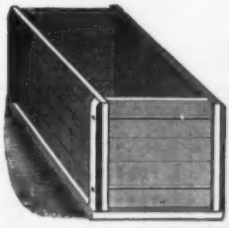

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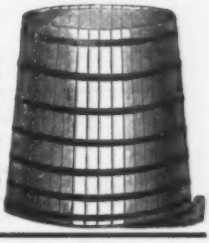

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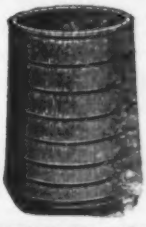

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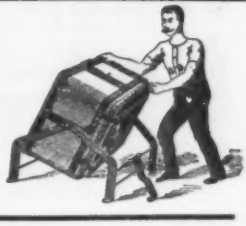

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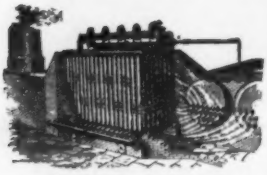

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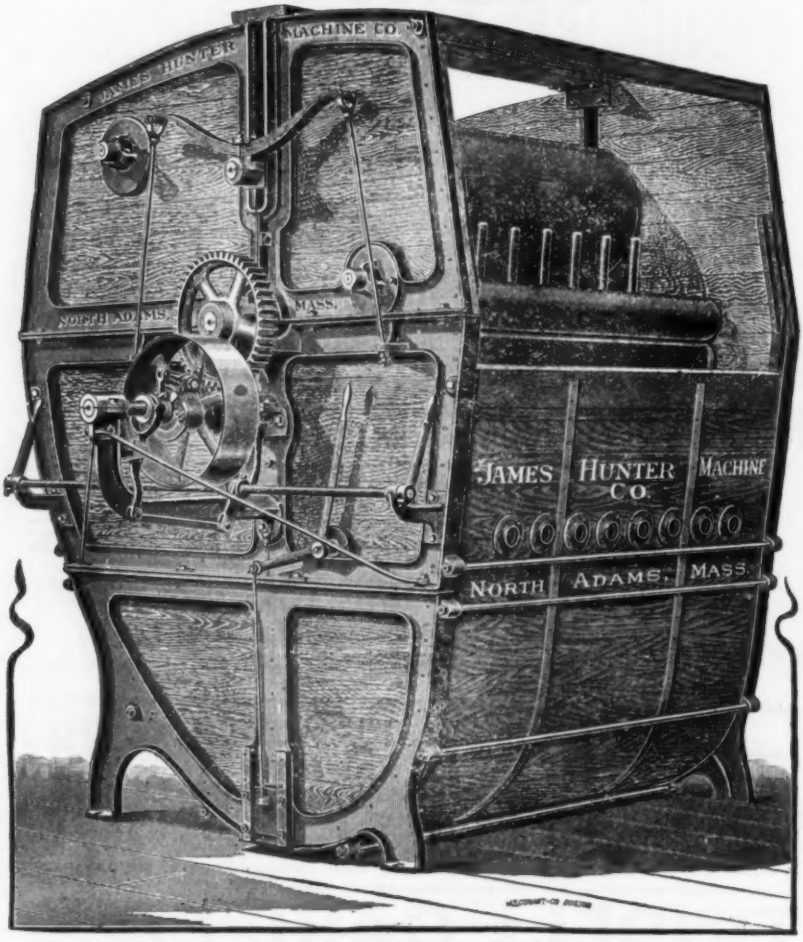

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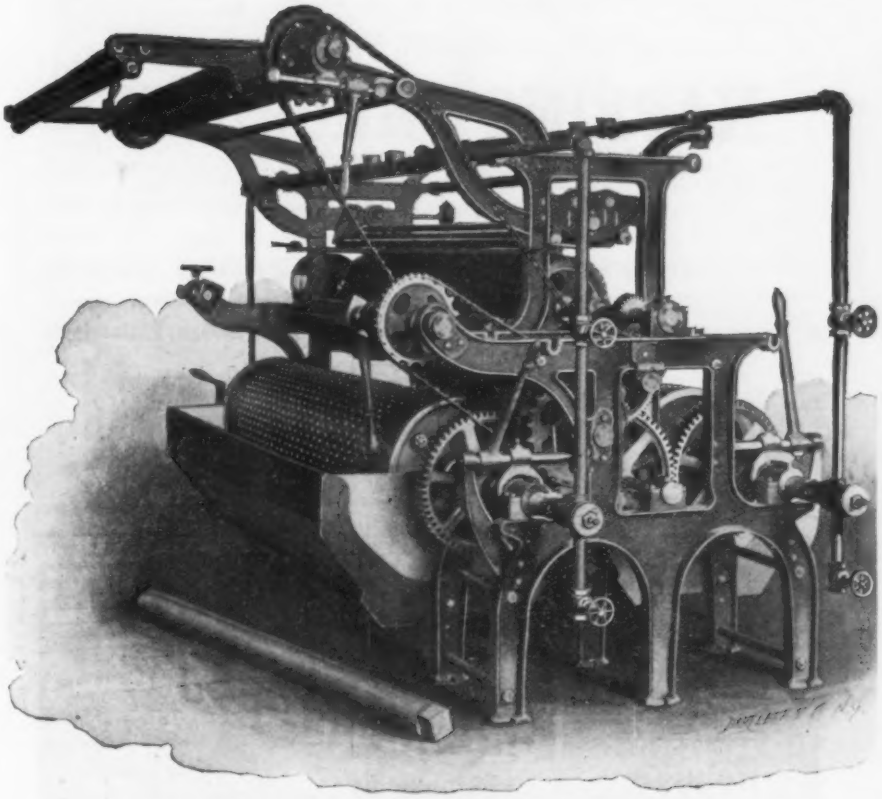

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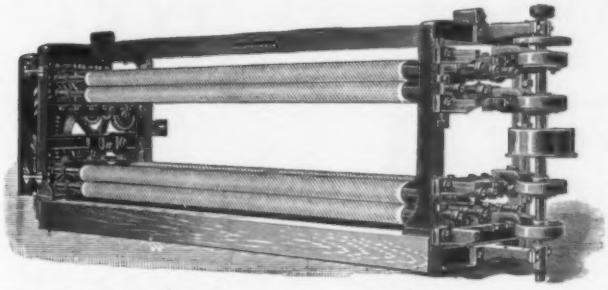

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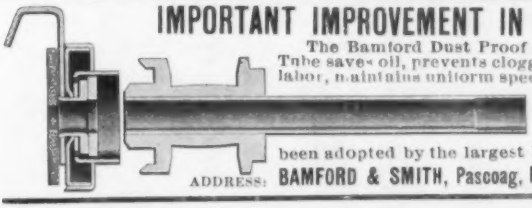

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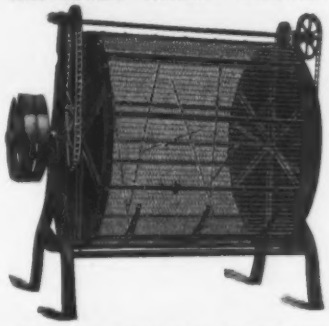

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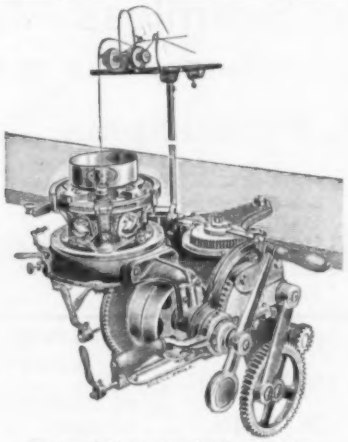

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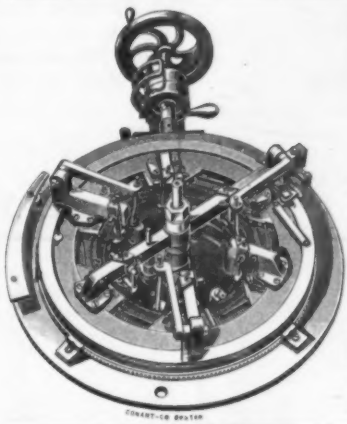

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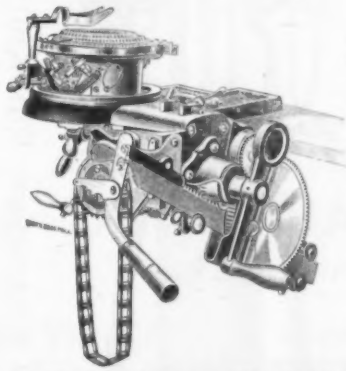

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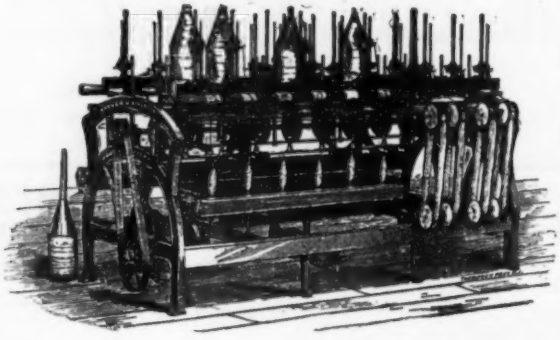

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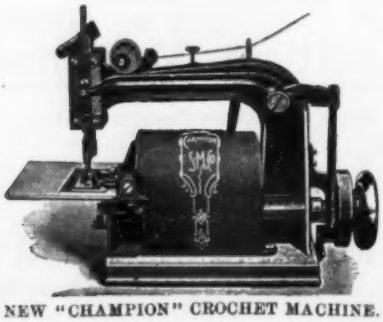

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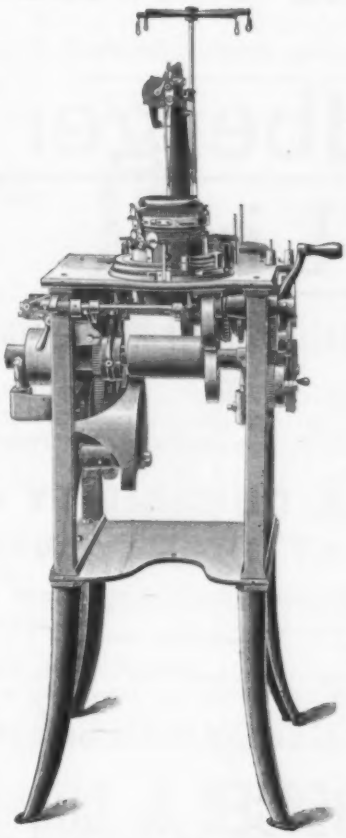

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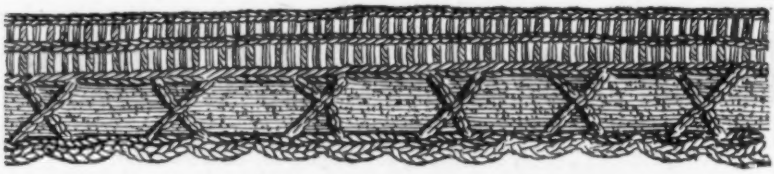

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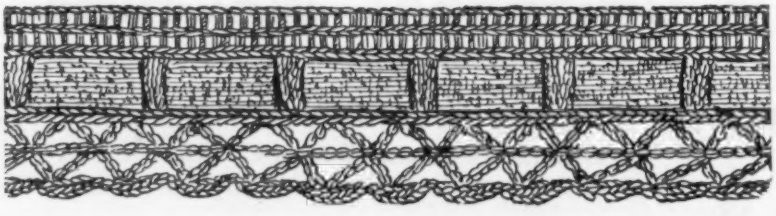

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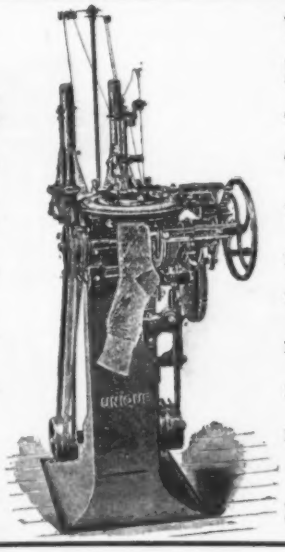

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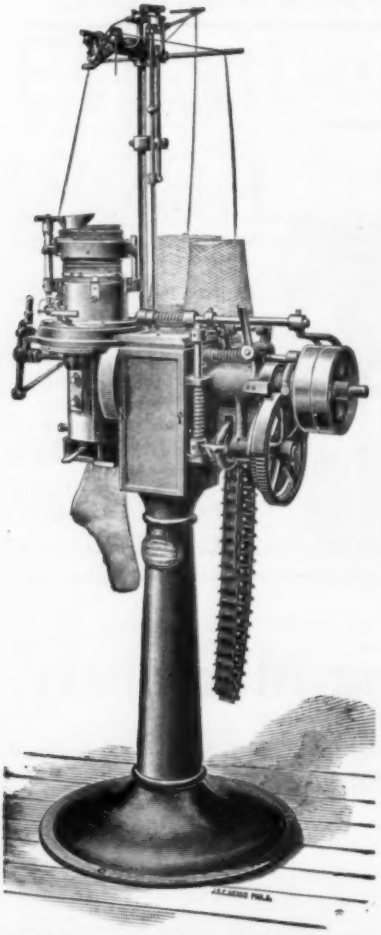

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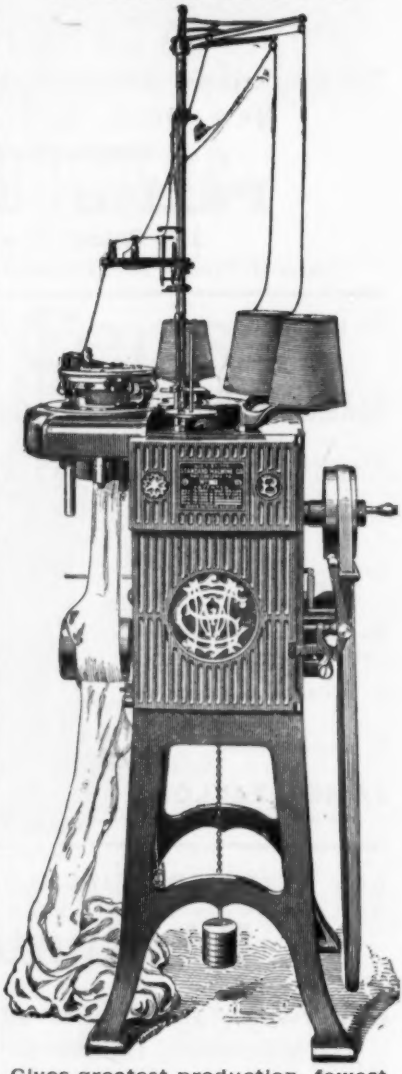

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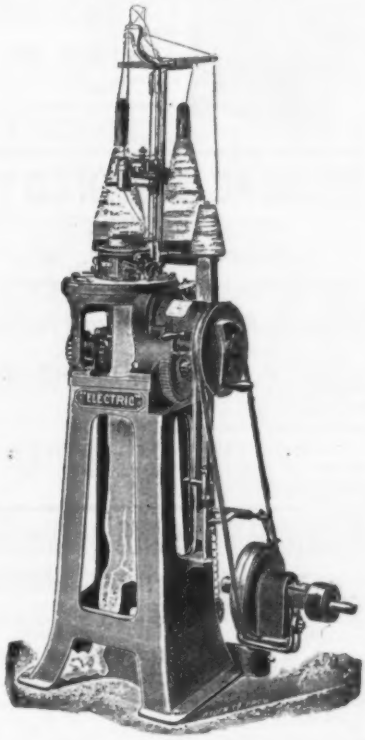

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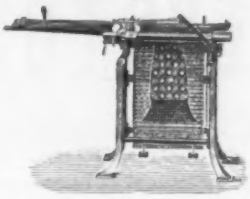

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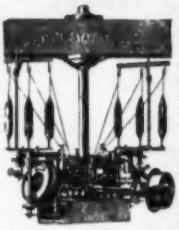

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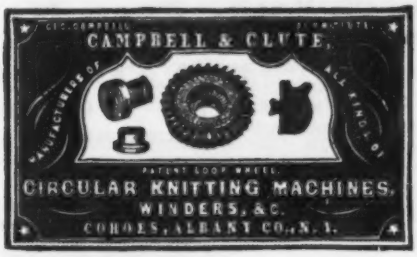

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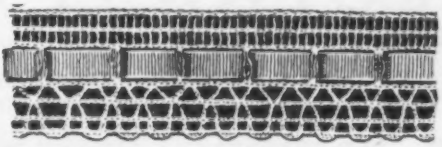
Lace  Edgings

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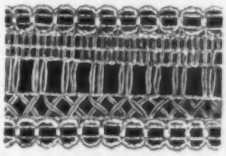

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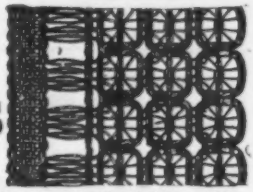

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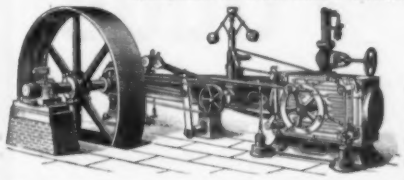

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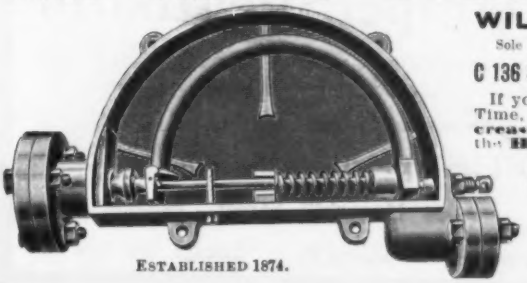

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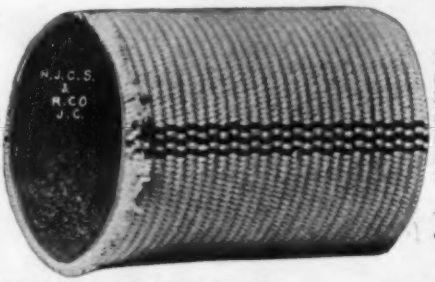

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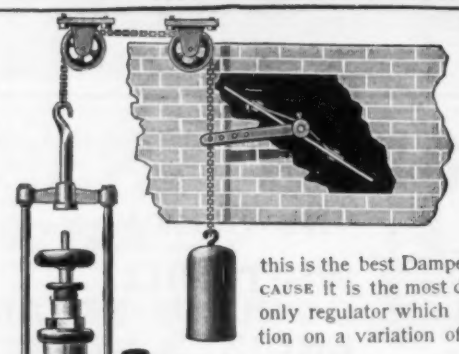

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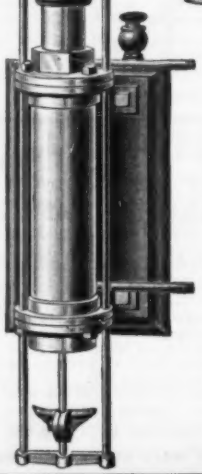

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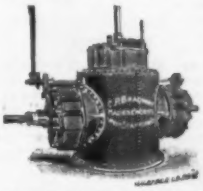

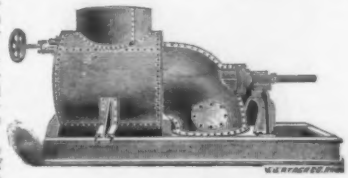

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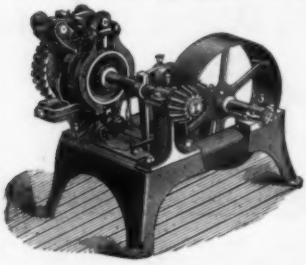

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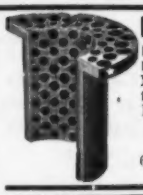

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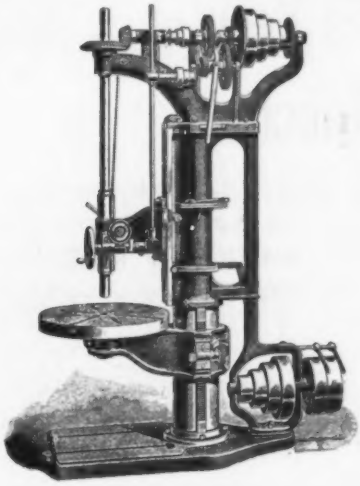

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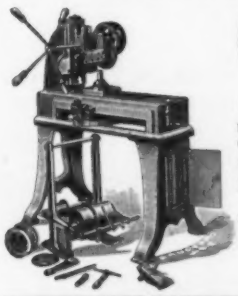

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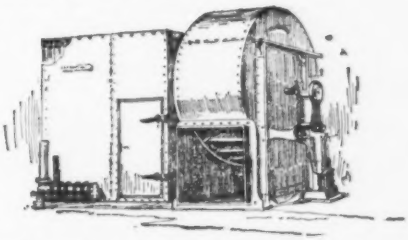

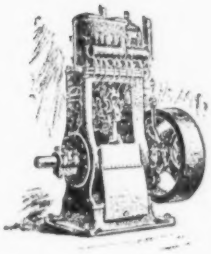

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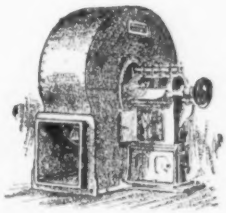

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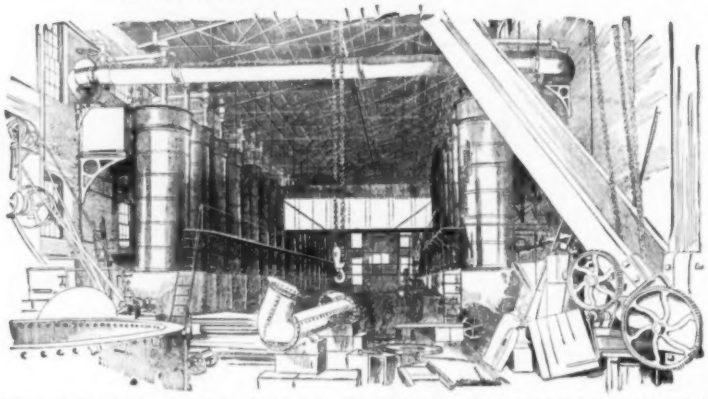

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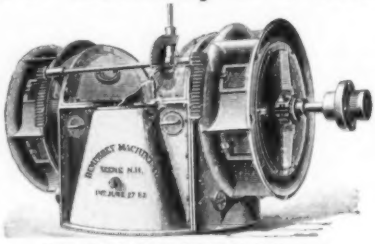

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